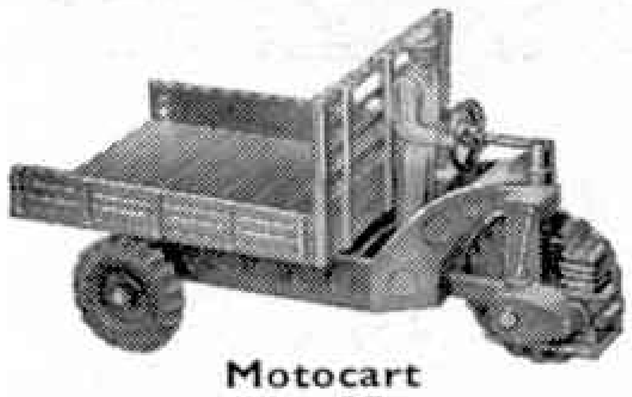
VOL. XXXV. No. 11 NOVEMBER 1950

MECCANO MAGAZINE

THE GRID

9D.

DINKY TOYS



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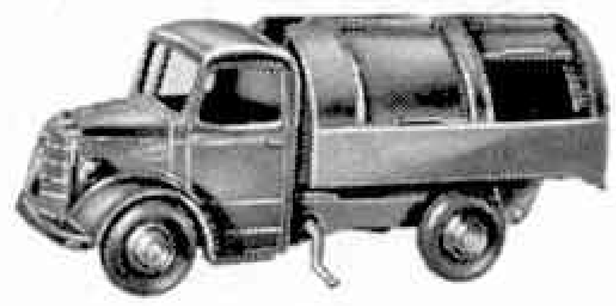

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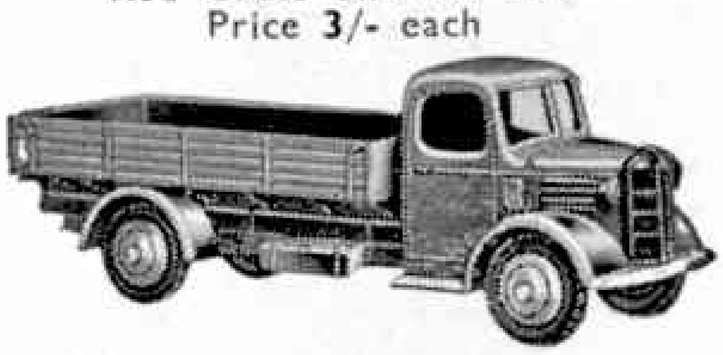

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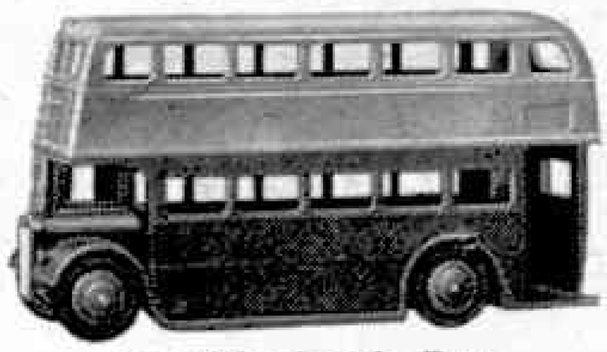

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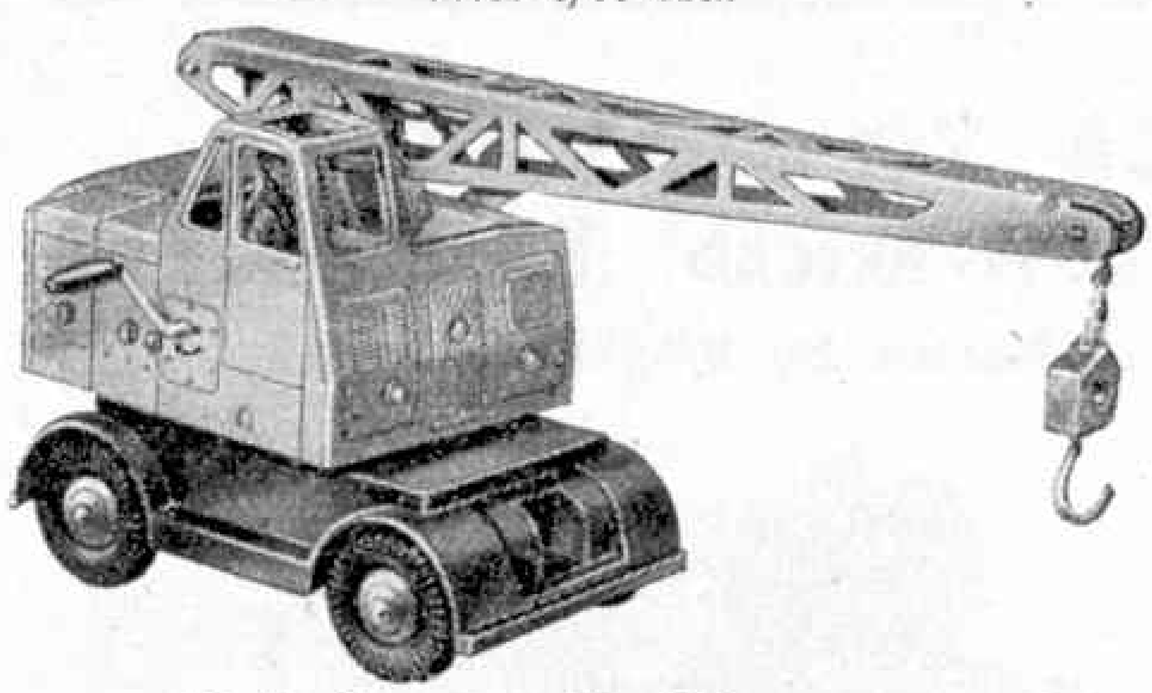

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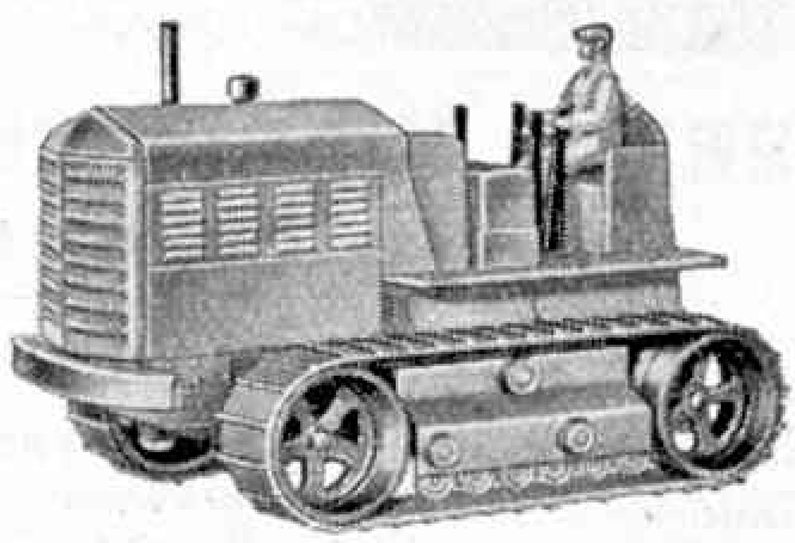

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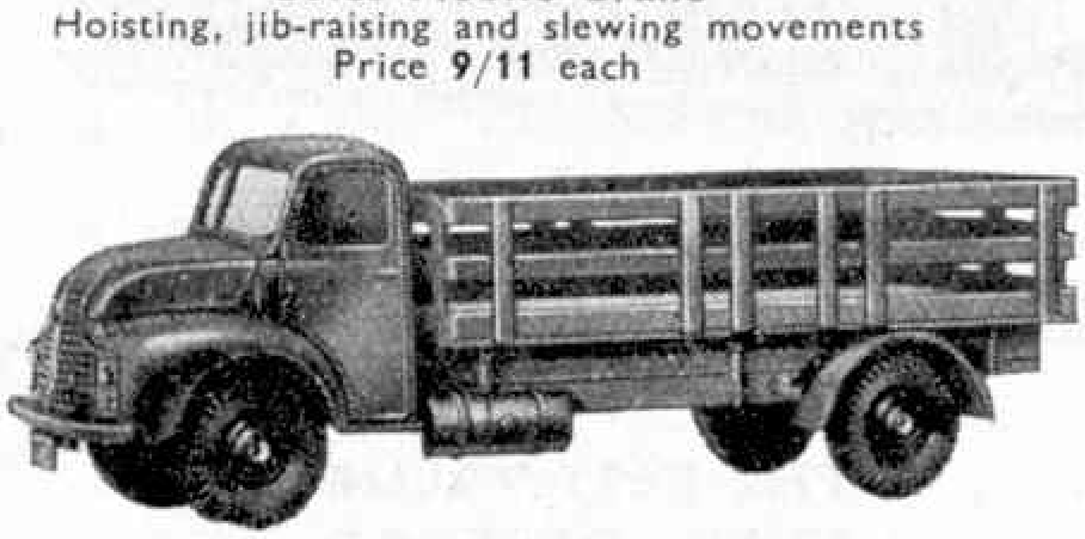

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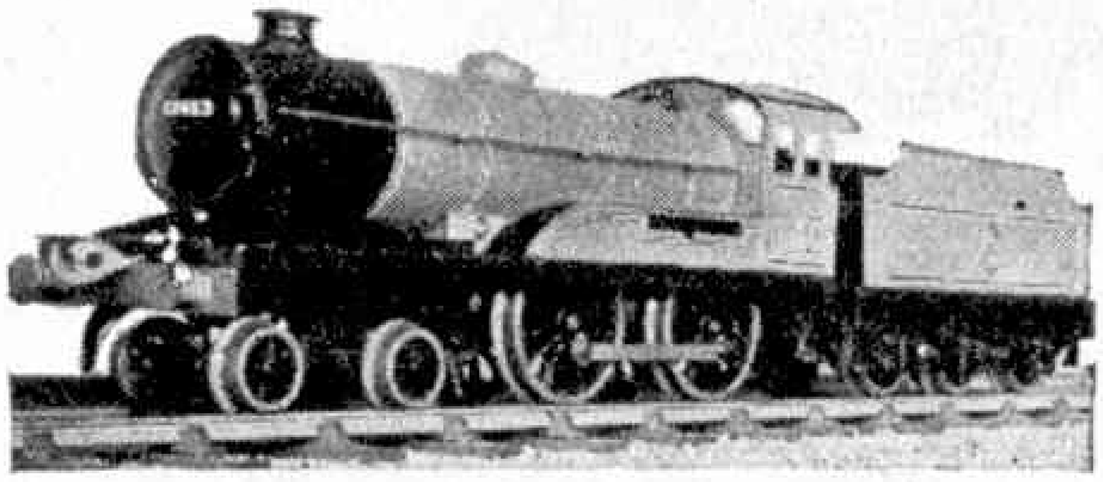

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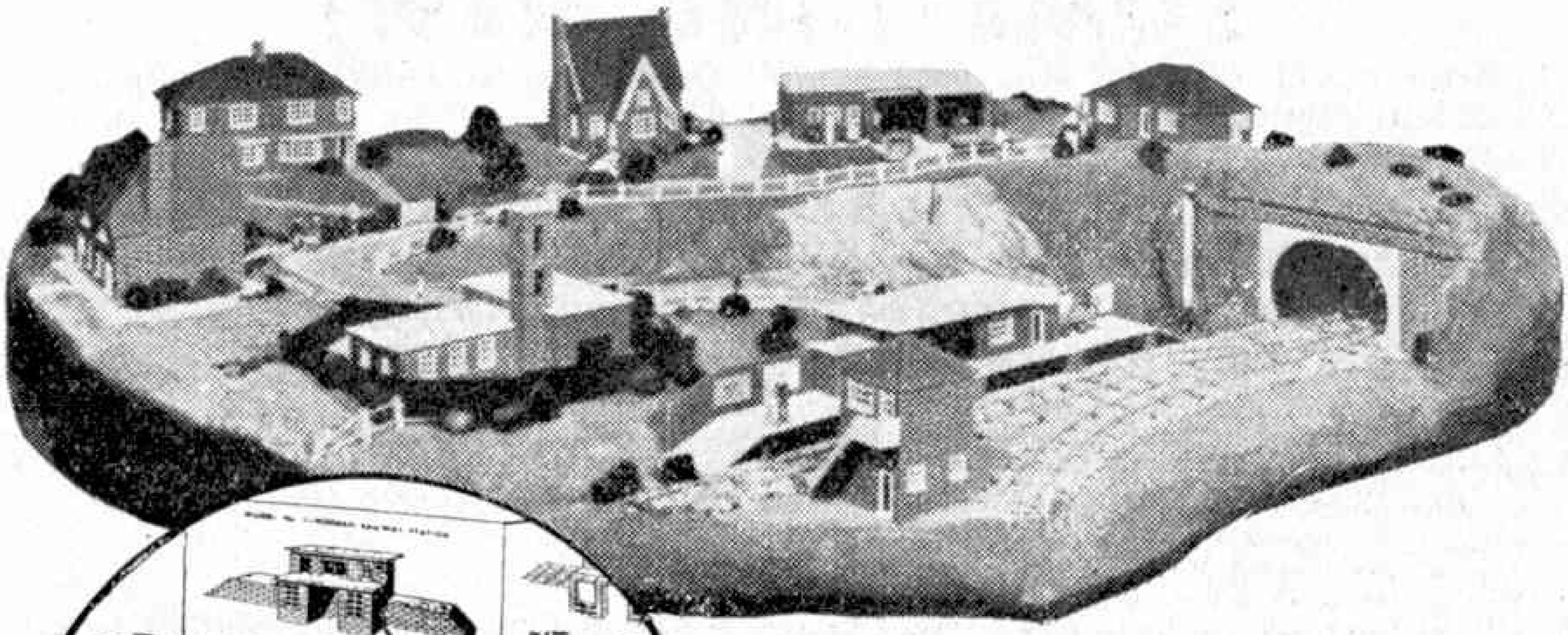

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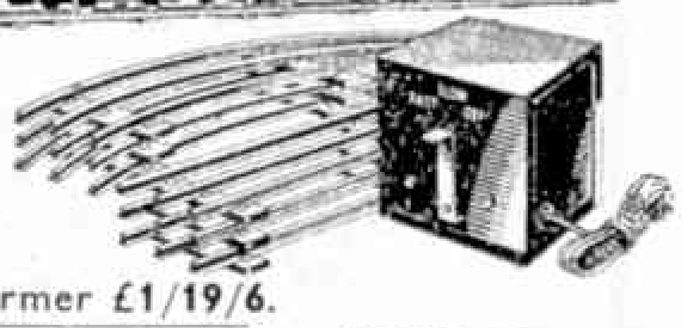

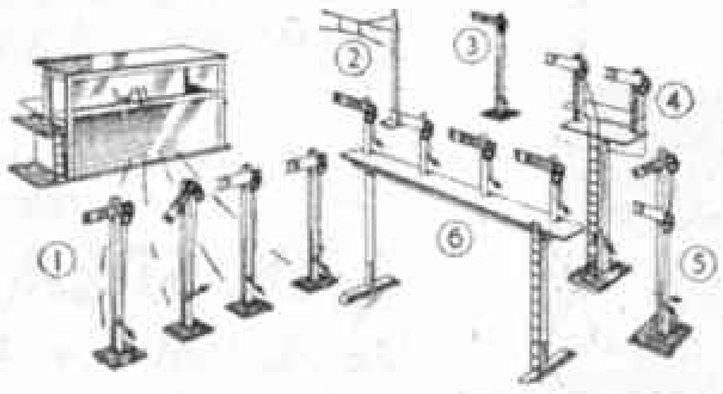

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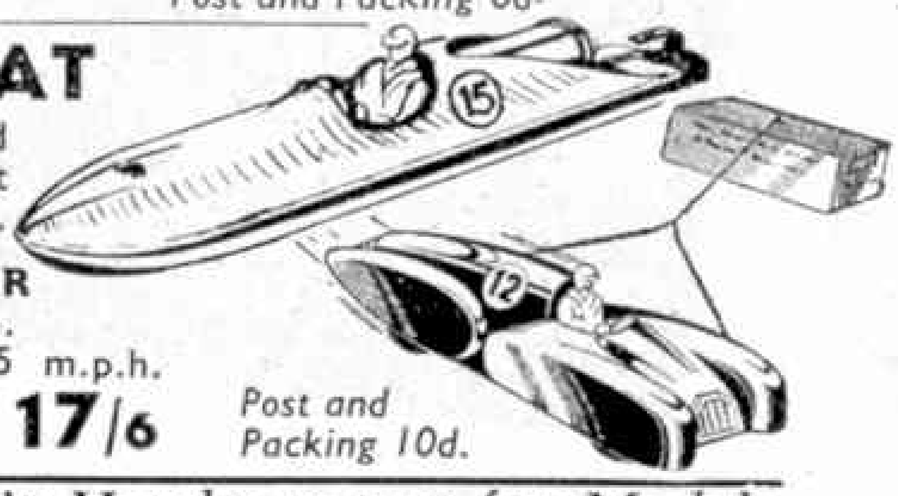

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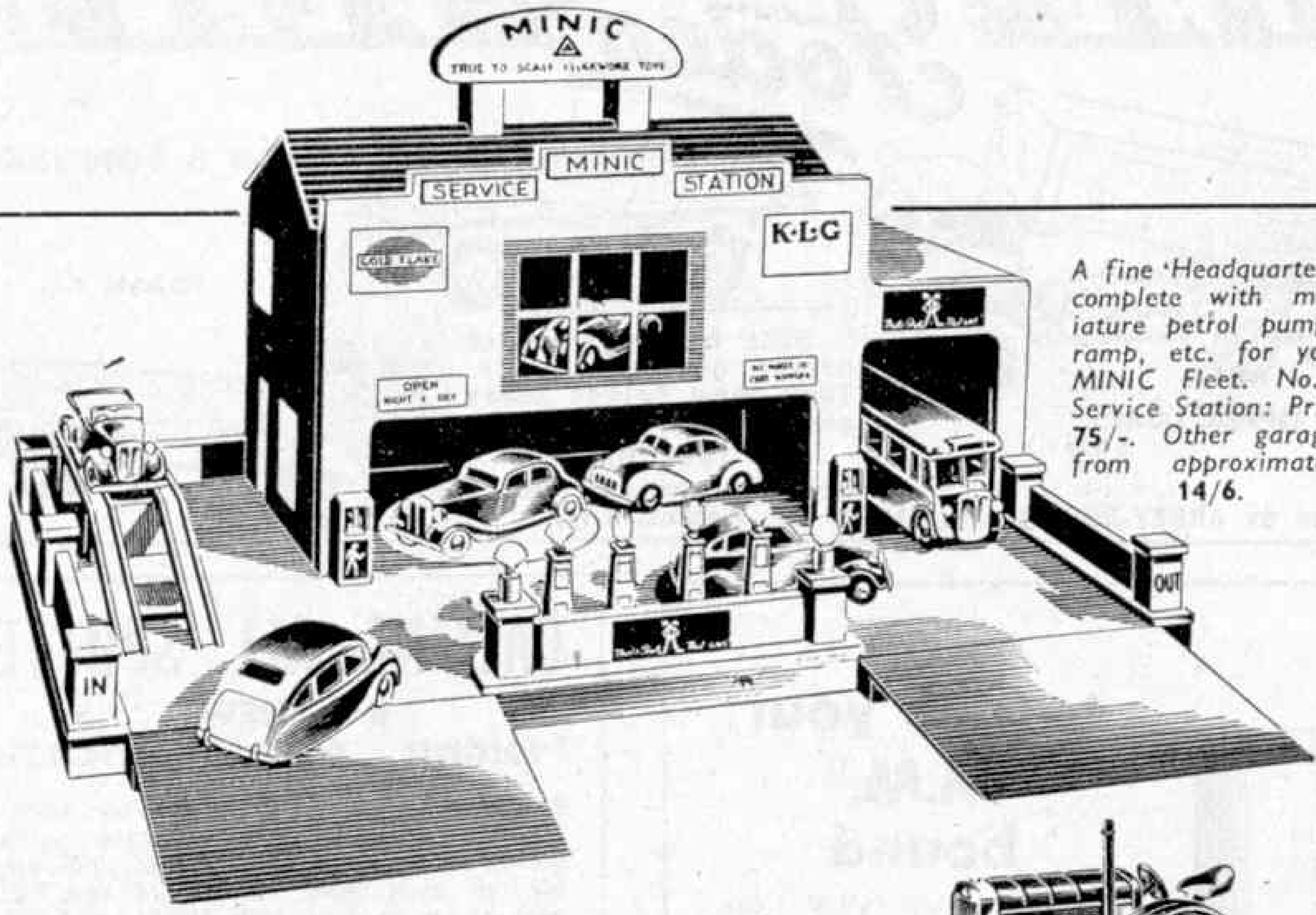

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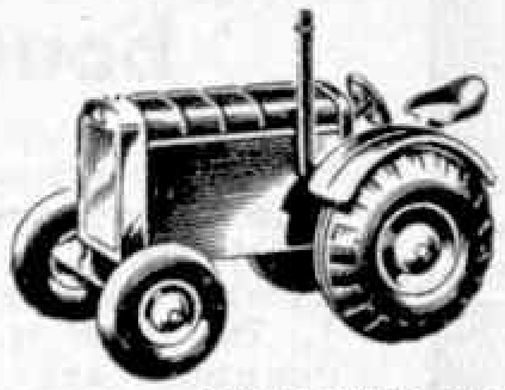

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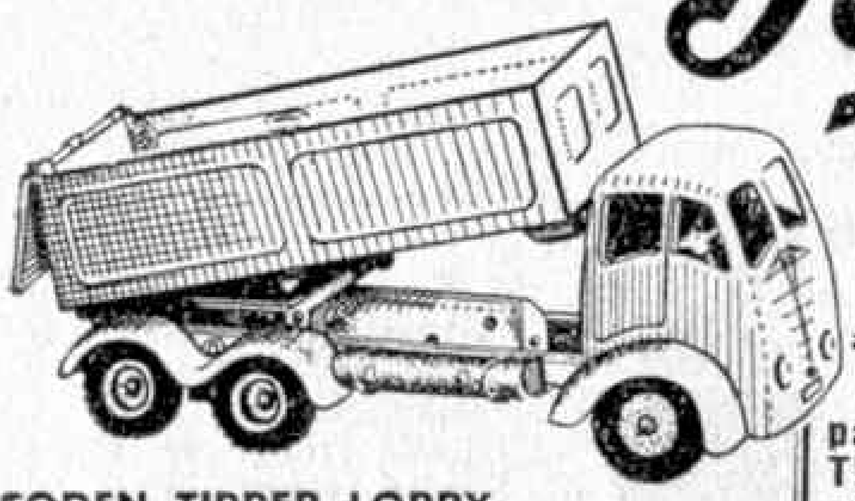

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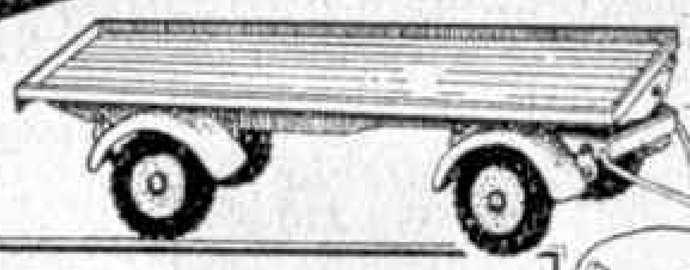
56/6



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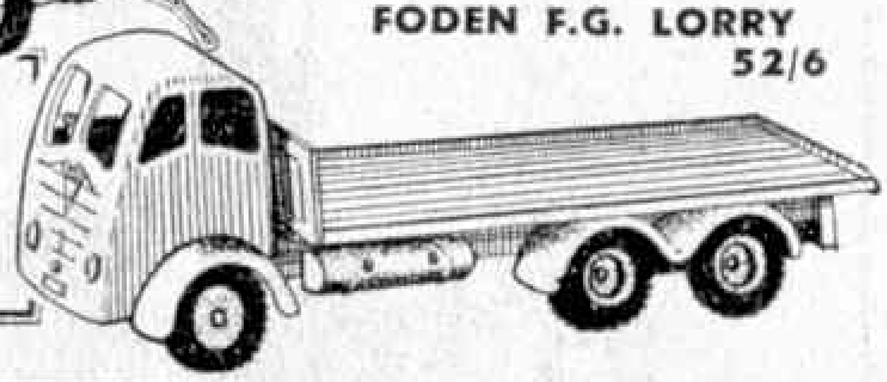
17/6



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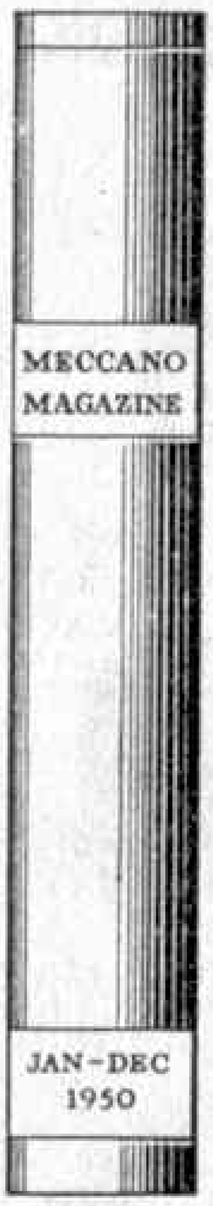

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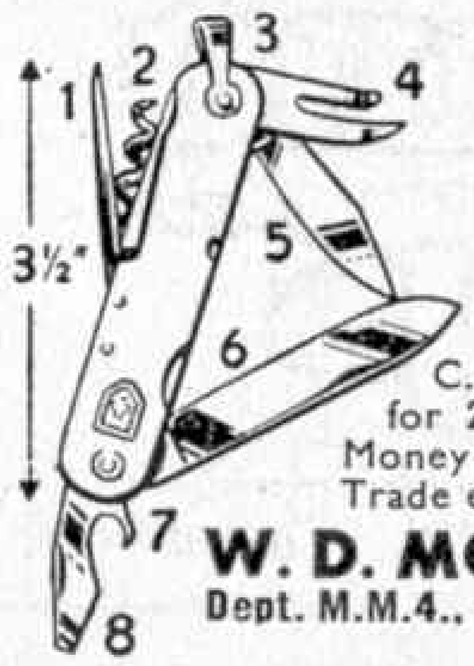

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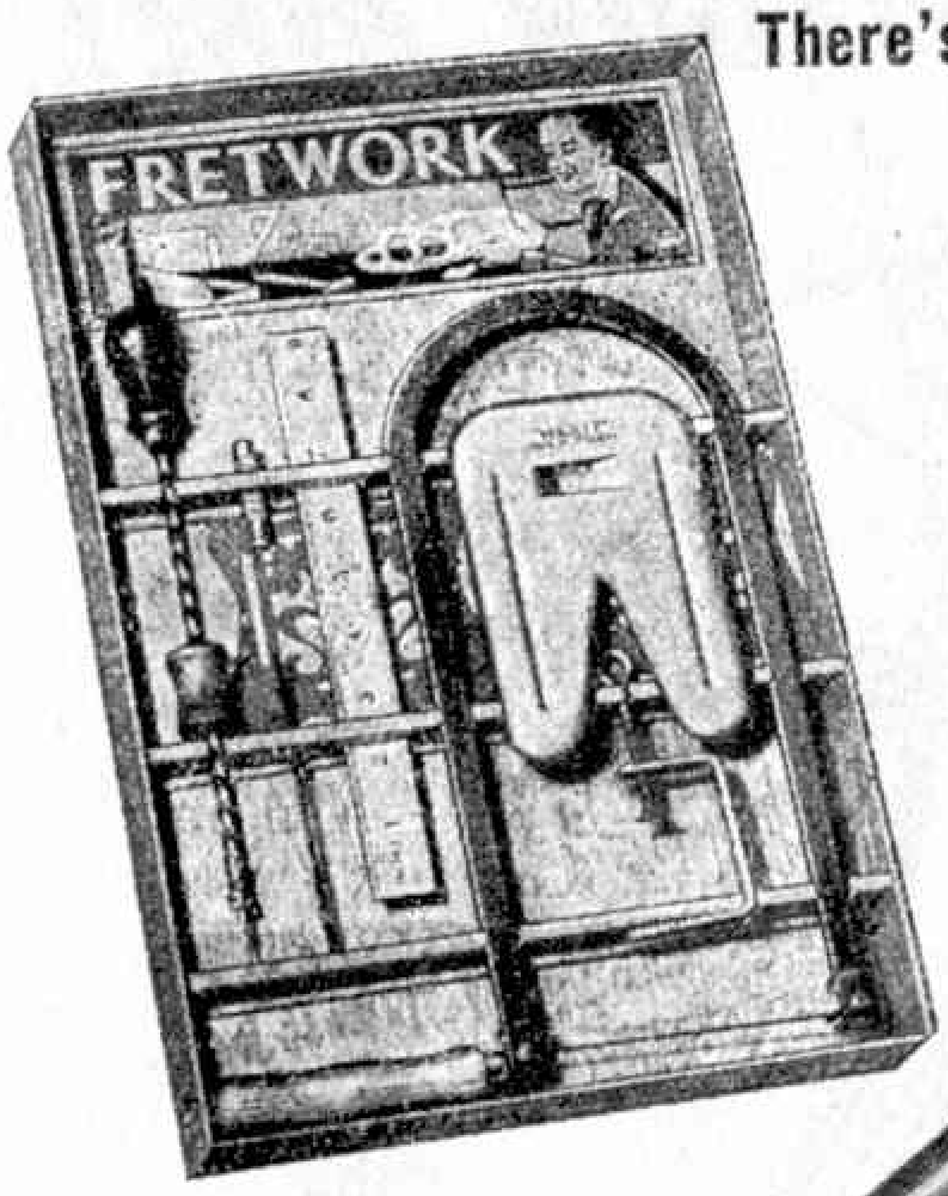

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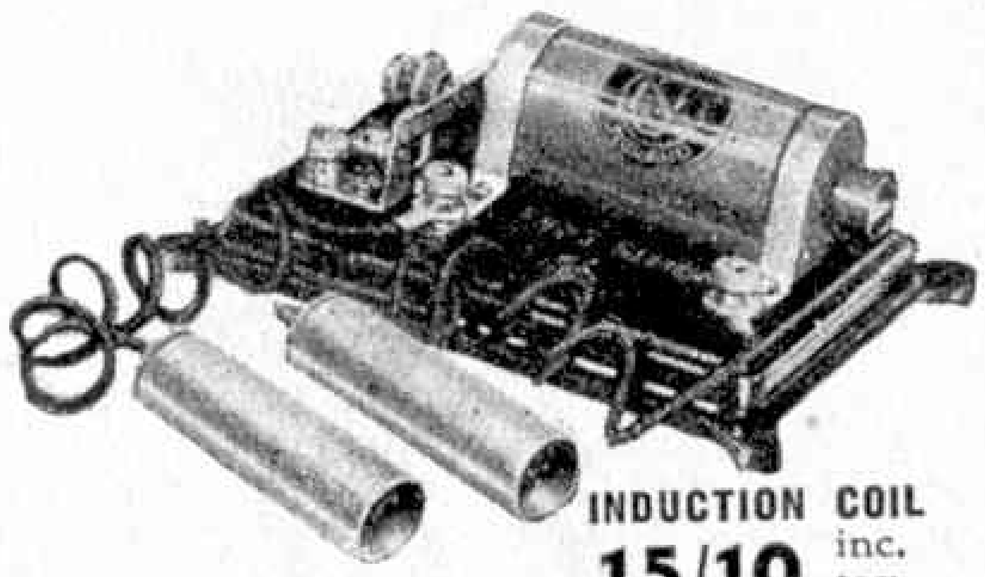

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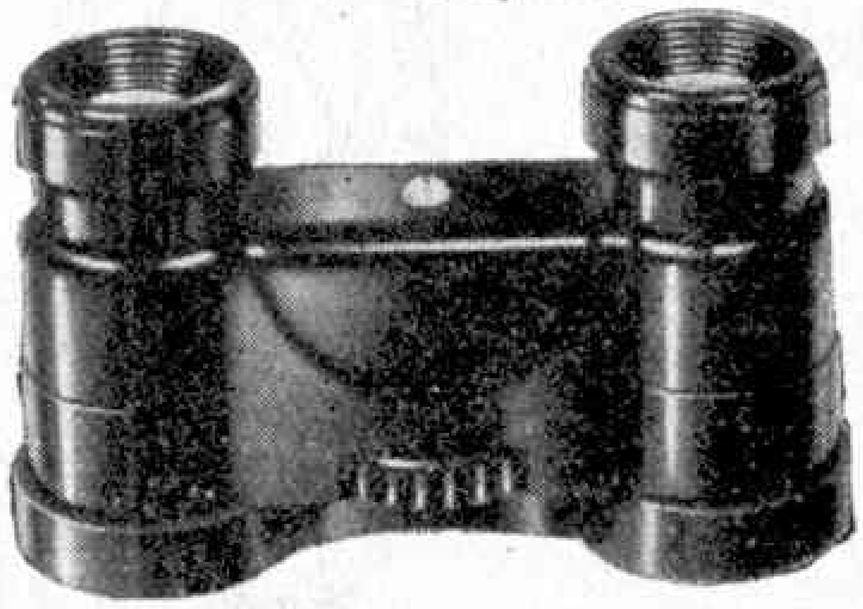

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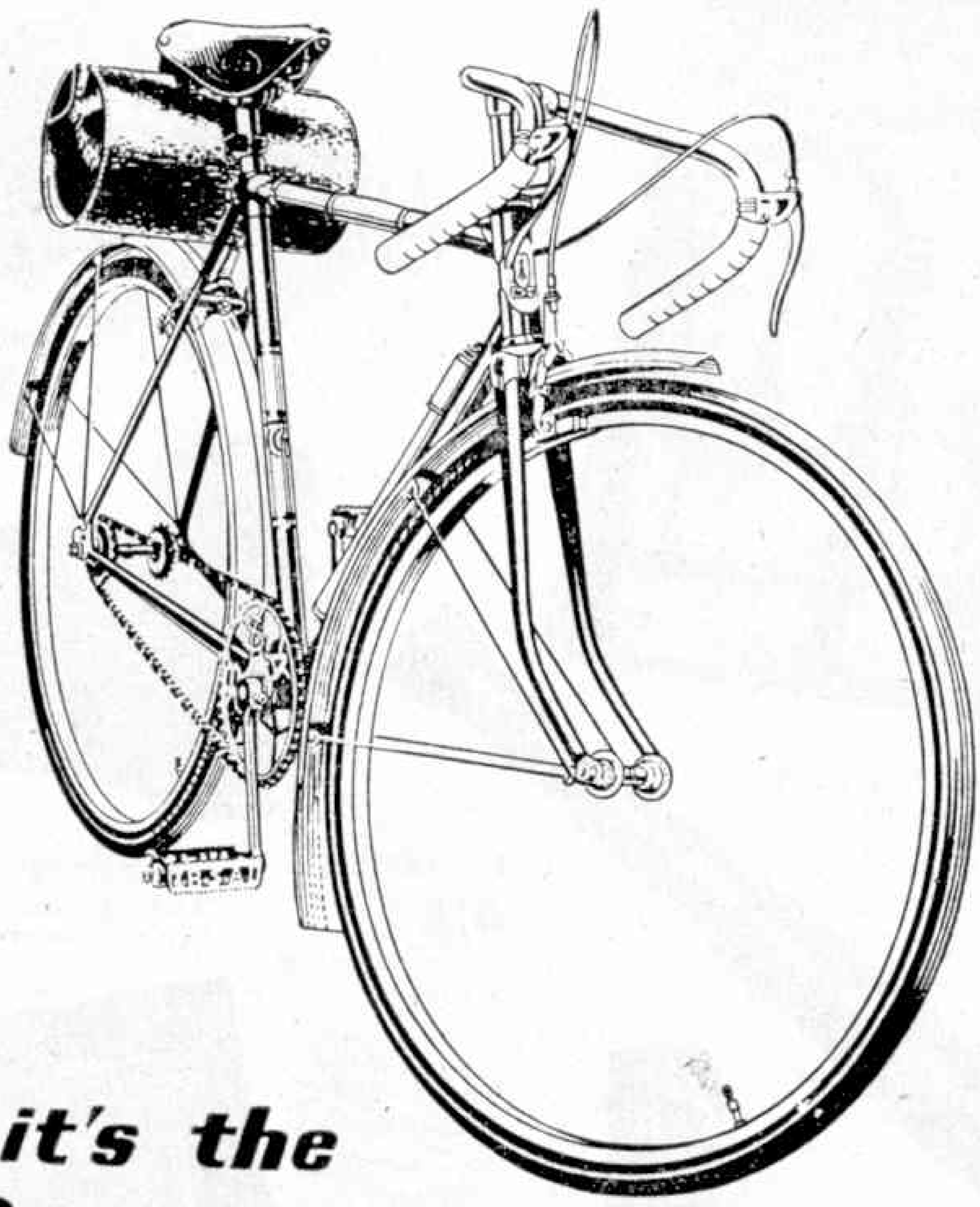

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MECCANO MAGAZINE

Editorial Office:
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Vol. XXXV
No. 11
November 1950

With the Editor

Britain's Aircraft Industry

During the last five years the British aircraft industry has been in the unenviable position of having to sit back and watch B.O.A.C. being re-equipped with foreign air liners. But there is another side to the picture that is often overlooked—the fact that during that time Britain herself has exported more than £100 million worth of aircraft, engines and aviation equipment.

"Vampires" and "Meteors" spearhead the defensive forces of more than a dozen free countries; British flying boats have been sold to countries as far apart as Norway, the Argentine and New Zealand; de Havilland "Doves" are in service in every corner of the world; Bristol "Freighters" are carrying everything from beef to bullion, from Teheran to Timbuctoo. Everywhere British equipment has been chosen because it is reliable, efficient—the best that money can buy.

While these fine machines have been coming off the assembly lines in their thousands, a new generation of civil and military aircraft has taken shape on the drawing boards at Hawker's, Bristol's, Fairey's, de Havilland's and a score of other world-famous British companies. Some of them were seen at the S.B.A.C. Display at Farnborough a few weeks ago; many others, newer, faster, bigger and even better, still remain secret. The world's largest air liner was there, side by side with the world's fastest air liner and the fastest-climbing fighter. The "Viscount," first jet air liner used in passenger service, flew by on only *one* of her four engines, followed by the beautiful "Ambassador" and the new "Universal Freighter" with its massive cargo hold.

There too was the "Canberra" jet-bomber, unsurpassed in beauty and performance, and the New Hawker P.1081 and Supermarine 535 swept-wing jet fighters, flying at speeds never before seen in this country. Then came a succession of night fighters, anti-submarine aircraft, trainers, helicopters and the little "Aiglet" family 'plane.

Every one was superb and every one was a thoroughly practical aircraft, for there were no "freaks" at Farnborough. Most revolutionary aircraft on show was the delta-wing Avro 707B research 'plane, which used a tail parachute-brake to reduce its landing run. But even "deltas" may well become a familiar sight in the next few years. In fact, "Farnborough 1950" left little doubt that Britain's aircraft industry is still the envy of the world.

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Exploring Underground England

By Arthur Gaunt, F.R.G.S.

IN several parts of the United Kingdom, since the end of the war, intrepid explorers have been probing the dark, age-old mysteries that lie underground. Caving in fact has been booming during the last five summers, and many discoveries have been made by men who have wormed their way through passages and fissures from cave to cave.

The existence of intricate subterranean chambers has been known for many years, but only during the present century have properly organised efforts been made to explore these caverns thoroughly and systematically. Now with the aid of wartime devices, the "cavers" are penetrating still farther under England's skin, and are entering caverns that not so long ago defied all who tried to reach them.

Down in Somerset there is the Cave Diving Group, a party whose equipment consists of "frogman" suits. This gear is that used by the Armed Forces during the war for underwater operations against enemy ships and minefields. It consists of a watertight suit and helmet, together with a self-contained breathing unit, which keeps the wearer supplied with oxygen while he is under water and thus makes him independent of an air line. Such equipment greatly extends the scope of operations, enabling the frogmen to probe narrow passages and tortuous turnings which a diver handicapped by an air line could not negotiate.

Divers equipped with "frogman" outfits, ready for exploration of caves and underground passages.

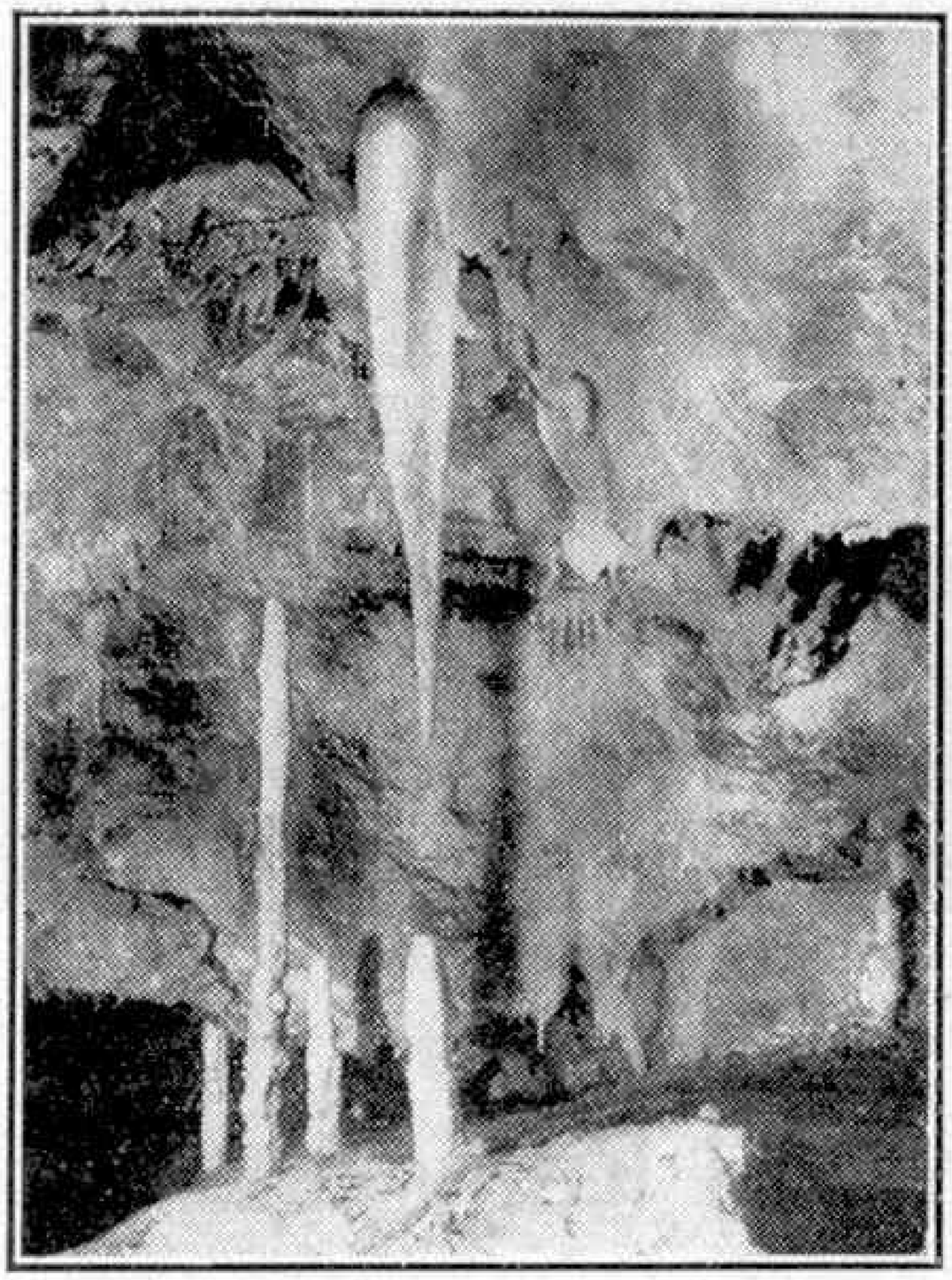
Wookey Hole Caves, in the Mendips, have been the scene of the main explorations. Though the outer chambers there have been a public showplace for many years, only recently has it been possible to reach the inner caverns and passages. Through these Somerset caverns flows the River Axe, emerging from a mysterious tunnel at the farther end of the Witch's Parlour, an eerie chamber associated in legend with strange happenings in distant times. For two-and-a-half miles beyond the opening the stream runs through a series of caves, but the connecting passages are submerged, so that negotiating them has presented unsurmountable difficulties until recent years.

The first attempt to get through from the river exit was made in 1935 with ordinary sea diver's equipment, and by this means the tunnels were penetrated as far as a seventh chamber. Recent efforts with "frogman" outfits have raised hopes that vastly bigger chambers will shortly be entered. The modern divers have also surveyed the bed of the river in the tunnels connecting the first and third chambers.

"Frogmen" have been active also in Derbyshire caves, where hitherto unexplored chambers in the Peak District have been entered by men wearing this up-to-date type of diving suit.

In Yorkshire, other courageous explorers have crept underground along passages which do not require diving apparatus, but where the dangers are only a little less severe. Dropping down "potholes" or vertical shafts in the limestone hills, they have reached intricate cave systems, and have glimpsed weird scenes formed by stalactites and stalagmites. In some cases they have entered by one shaft and emerged at another half-a-mile or more away.

This probing of "potholes" really began in 1872, when John Birkbeck descended into the bowels of the earth by going 200 ft. down Gaping Ghyll Hole, in the



Stalactites and Stalagmites in Kent's Cavern, Torquay.

Pennines. Even this failed to "bottom" the descent, but in 1893 a Frenchman named Martel succeeded in getting to the foot of the shaft. He was then 370 ft. below the entrance.

Subsequent activities by other "cavers" have enabled accurate maps to be drawn, showing this and surrounding cave systems. Yet some mysteries remain, and soon "frogmen" may tackle these as they have done elsewhere. For instance, a gallery at Gaping Ghyll leads to a shaft into which a river dives, and questions are being asked about what lies beyond the farthest point so far reached.

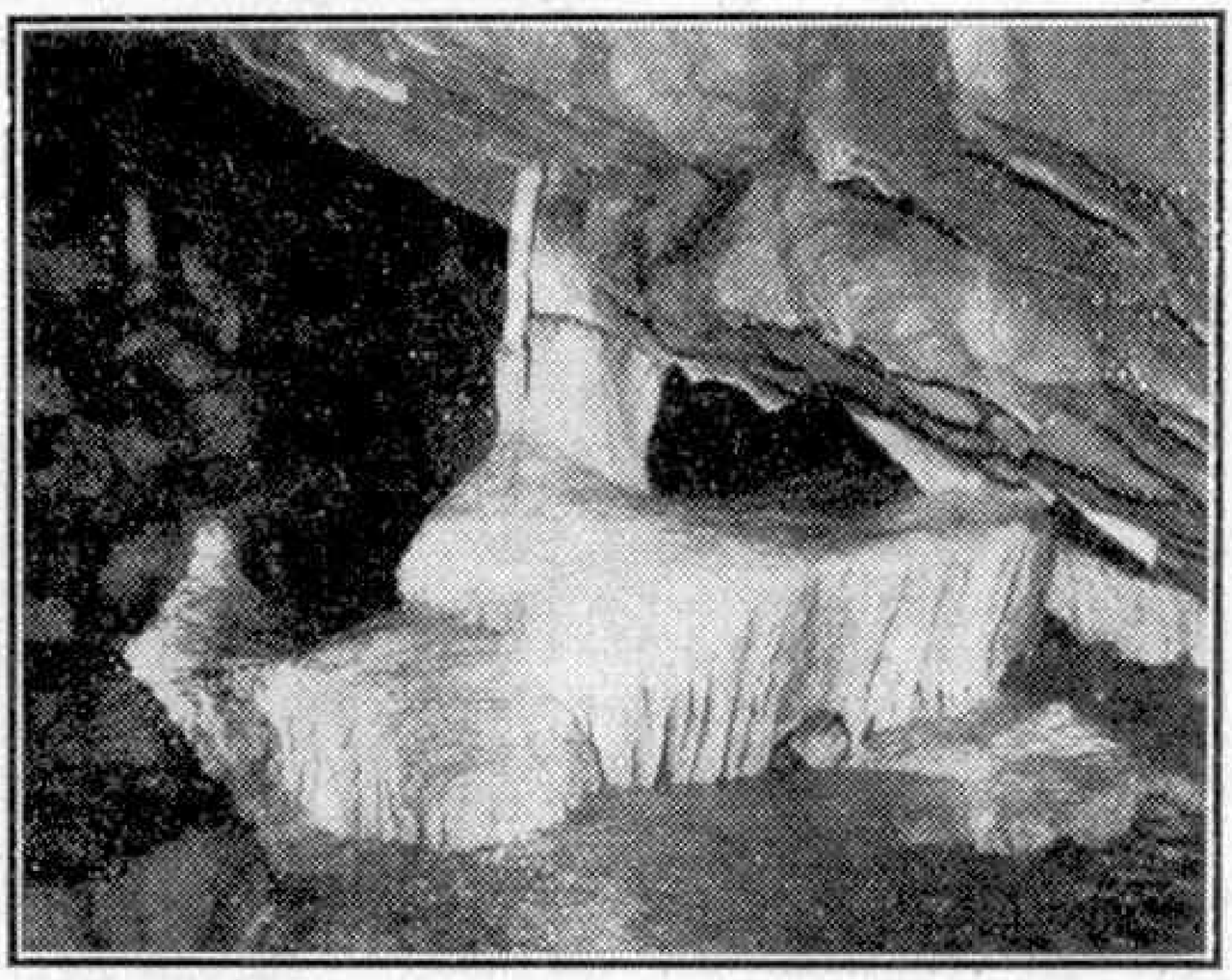
Nidderdale has its caverns, too, and although some of these were among the first to be explored in modern times, they still continue to reveal secrets from time to time. Stump Cross Caverns under Greenhow Hill, near Pateley Bridge, were accidentally found by miners prospecting for lead 90 years ago. Later the chambers were opened to the public, and thousands of tourists have inspected them.

Yet the existence of further subterranean passages was long suspected, and only last year a group of "cavers" from Driffield undertook to investigate the belief. Starting at a point one-and-a-half miles from the entrance to the caves, they slowly worked their way up a vertical shaft to a passage. This soon branched into two, and both byways were explored. At times the roof came so low that it was necessary to crawl, but eventually a new cavern was entered. Here was found a series of amazing stalactite formations, one resembling a folded ribbon and another in the form of a gigantic curtain of pearly limestone only one-eighth of an inch thick.

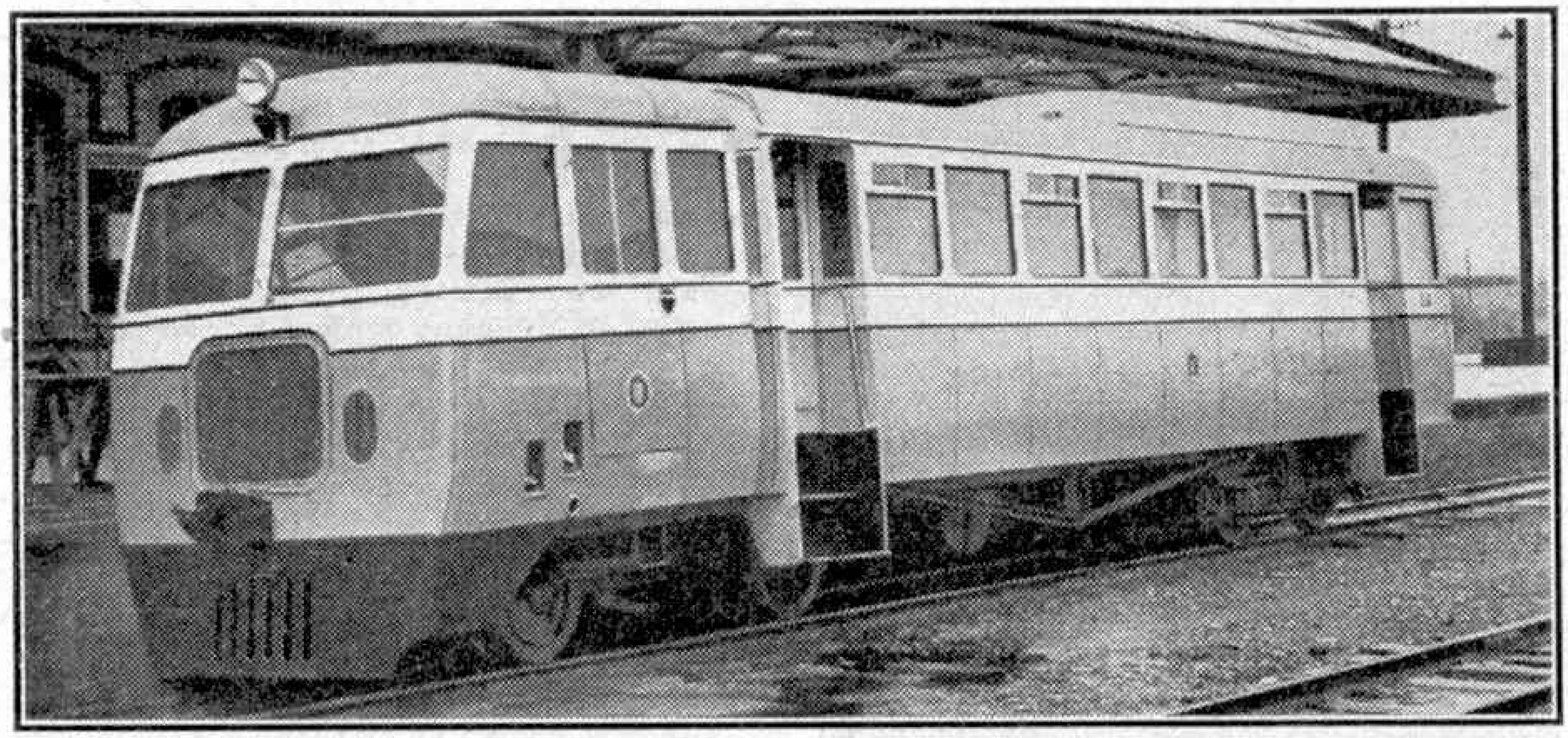
These explorations have made the Stump Cross Caverns the longest explored underground network in the United Kingdom. The length of passages so far followed actually exceeds that of the Cheddar caves.

What is the value of these efforts, apart from the thrill of conquering new worlds? Many of the chambers yield information about life and conditions thousands of years ago. From remains discovered far underground we know that Britain ages ago was the home of such animals as the bear, tiger, and hyena. In January 1948 a fine specimen of the skull of a bear was discovered in Kent's Cavern, near Torquay. The relic has since been estimated to be about 350,000 years old.

From the bed of the subterranean River Axe "frogmen" have retrieved tools and ornaments of prehistoric Man, proving that the caves were inhabited in far-distant times. The finds already made are indeed sufficient to prove conclusively that the caves of Wookey Hole were tenanted continuously for at least 700 years.



This curious limestone formation in Stump Cross Caverns, Nidderdale, has been given the name of The Baby's Cradle.



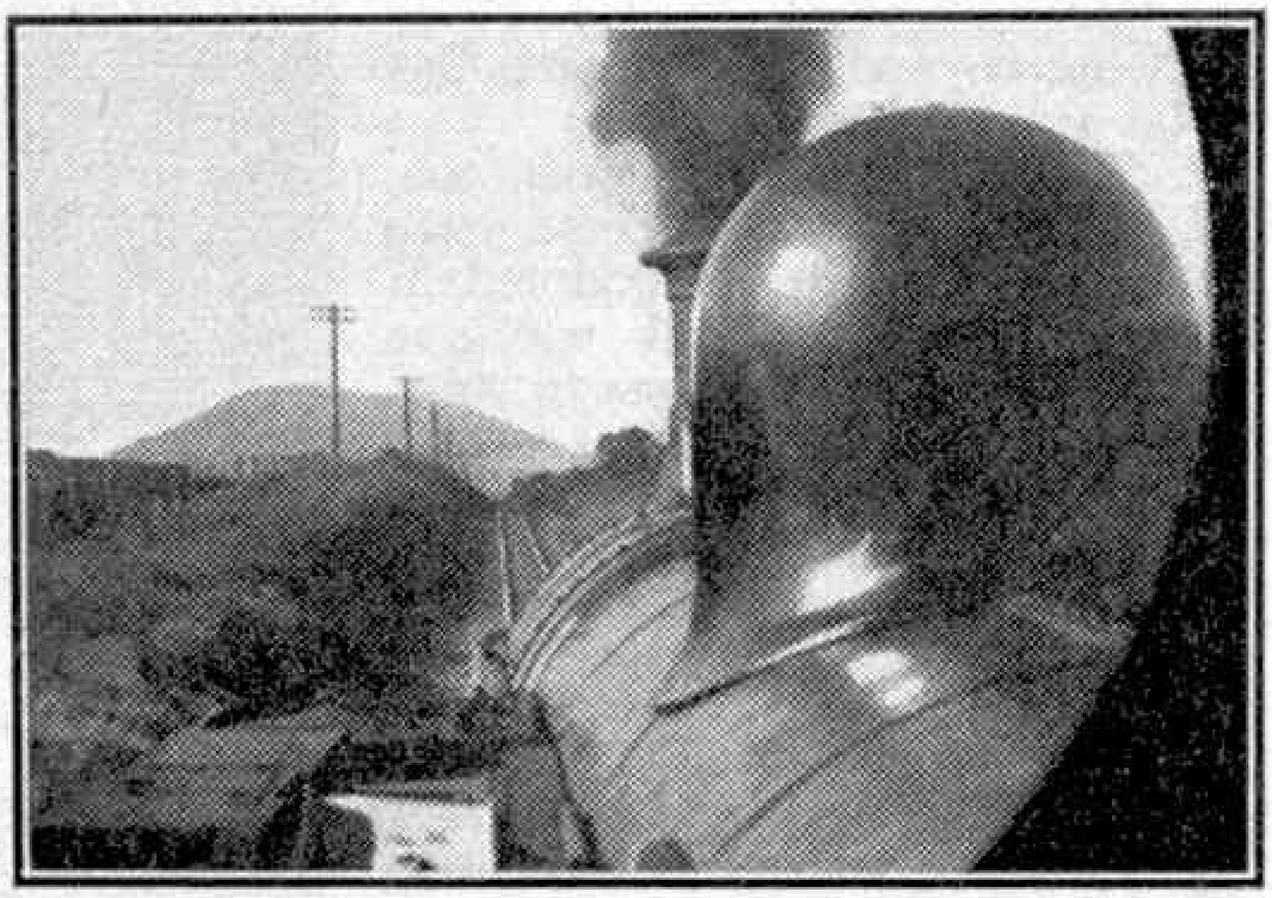
Railcar No. 19 of the County Donegal Railways showing the distinctive front of the all-over cab. Photograph by courtesy of the "Derry Journal Ltd."

The County Donegal Railways

DONEGAL, one of the largest counties in Ireland, is famous for the beauty and variety of its coast and hills, but tribute must be paid also to its two narrow gauge (3 ft.) railways, the larger of which is operated by "The County Donegal Railways Joint Committee."

This, as its title indicates, is a Joint Committee with members appointed by the Great Northern Railway (Ireland) and the British Transport Commission. The Railway began in 1863 as the Finn Valley Railway Company, which was merged in 1892 with the West Donegal Railway, then ten years old, to become the Donegal Railway Company. In 1906 the latter company was acquired by the Joint Committee, the Midland Railway being then the contracting party whose interests were passed on to the subsequent L.M.S. and later to the British Transport Commission.

The main line of the County Donegal Railways leads westward from Strabane, where the narrow-gauge Derry line of the former N.C.C. runs into the same station. This station accommodates also the Strabane and Letterkenny trains, and it adjoins the station of the Irish standard gauge G.N.R. Derry line. At Stranorlar are the headquarters of the system and the locomotive shops and sheds. On leaving Stranorlar the main line crosses the River Finn and immediately begins the steep ascent to Barnesmore Gap, where the gradient is 1 in 50 for a distance of over five miles. The moorland water of Lough Mourne is encountered at an altitude of 600 ft. At Derg Bridge the line enters the defile of Barnesmore Gap where railway, road and river just manage to squeeze through the narrow rift. After the summit there is a rapid descent from Barnesmore Halt at 1 in 60, and a continuous switchback road brings the line down to Donegal, 31½ miles from Strabane.



The view ahead from the footplate of No. 8 "Foyle," climbing the Barnesmore Gap. This photograph and those on the next page are by courtesy of the County Donegal Railways.

At Donegal the track divides and the main line goes to Killybegs, a sharply curved and steeply graded length. The other route, referred to as the "Branch" in the railway's working timetables, stretches for 15½ miles to Ballyshannon. The gradients on the branch are less severe than elsewhere.

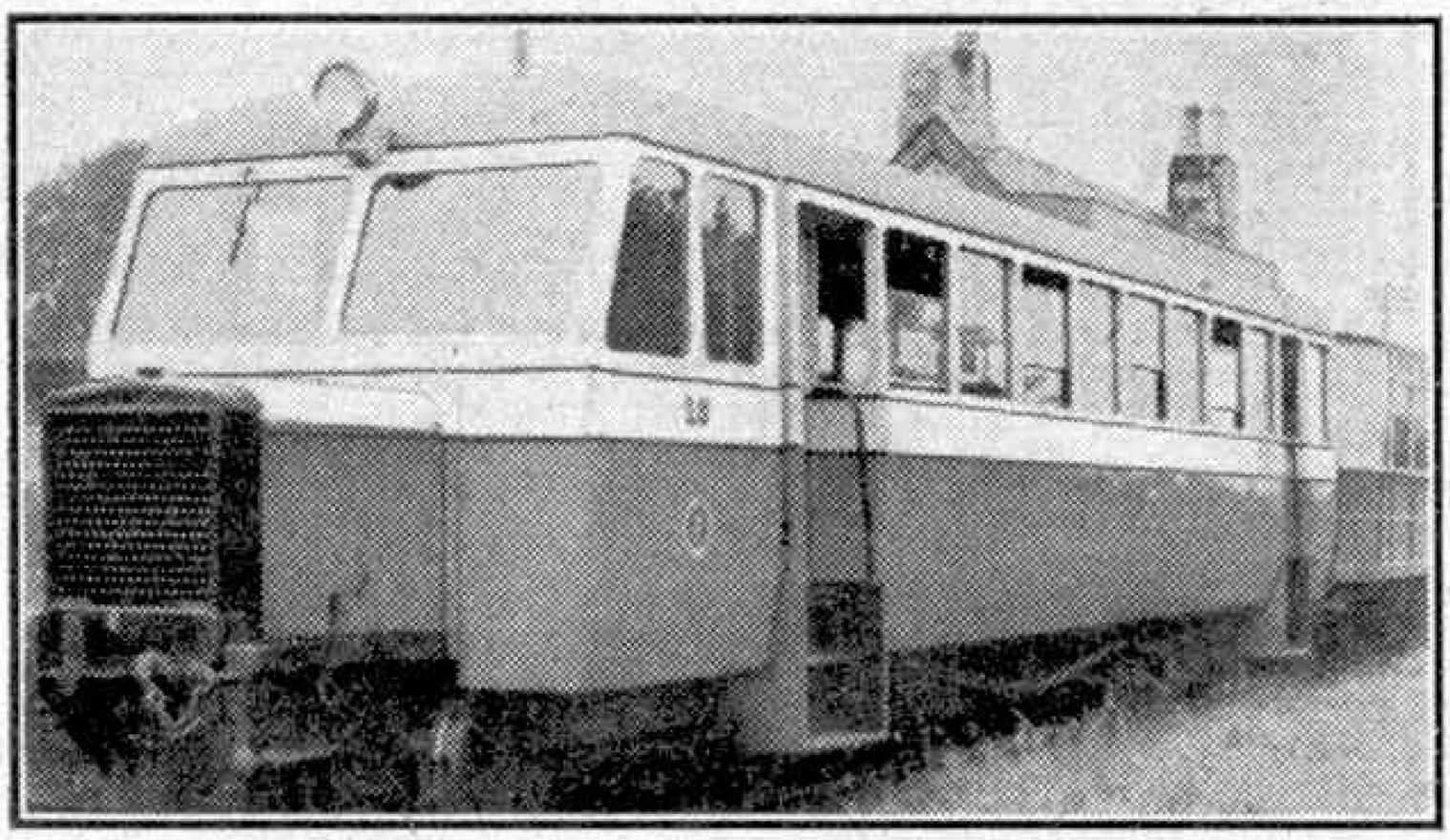
To-day the County Donegal run five services each way per day between Strabane, Stranorlar, Donegal, Inver and Killybegs, a distance of 51 miles, with four services each way between Donegal and Ballyshannon, 16 miles. The Strabane and Letterkenny Railway, opened in 1906, also is owned and controlled by the Joint Committee, and seven return services are operated each way over the 19 miles between Strabane and Letterkenny. A further branch line 25 miles in length between Stranorlar and Glenties is only open for livestock traffic, passengers and merchandise being conveyed by road.

Donegal Station with typical steam rolling stock alongside the left-hand platform. Railcars are seen travelling on each of the main line tracks.

The County Donegal have the unique distinction of having pioneered serious internal combustion railcar working in Great Britain and Ireland. As a consequence of the 1926 coal strike, they first introduced this mode of traction by the operation of a small petrol road bus with railway wheels substituted for those of normal road type. The experiment was so successful that it was continued and developed considerably so that to-day passenger services are covered by modern railcars powered by six-cylinder diesel engines of 102 h.p.

Locomotive-hauled trains operate "mixed" and excursion services, but the economy of the system is centred on railcar working. To see these vehicles in operation is convincing proof of their amazing adaptability; it is common for them to haul a coach or trailer car and two wagons of luggage or perishable merchandise despite the heavy gradients they have to negotiate.

The latest railcar, No. 19, follows generally the design of the previous units of the separate power bogie type, the first of which went into service in March 1934. In this latest vehicle, however, the driver's cab is built right out to the rounded front to enclose the engine, and there is a separate entrance door each side for the use of the driver. The car provides accommodation for 41 passengers on tubular frame seats, beautifully cushioned and upholstered.



Railcar No. 15 and trailer. The projecting bonnet and radiator is typical of the front-end design of the earlier railcars.

As with the previous cars, the power bogie complete with cab, which is of timber construction, was provided by Walker Bros. (Wigan), the passenger body, underframe and rear bogie being built in the Dundalk Works of the Great Northern Railway, Ireland. The unit is powered by a six-cylinder Gardner engine of the type that has been standard since 1936 for County Donegal railcars.

County Donegal steam power is represented by this picture of one of the 4-6-4 tanks. Photograph by courtesy of County Donegal Railways.

Transmission is through a clutch and four-speed gear-box, thence through a shaft and worm drive mounted on the rear power bogie axle. The drive is connected to the leading wheels by coupling rods, as usual.

Previous railcars had the fuel tank mounted just above the engine with the filler opening in the driver's cab. On No. 19 the fuel tank is carried below the floor of the power bogie on the left-hand side and has an outside filler. The tank capacity is approximately 33 gallons.

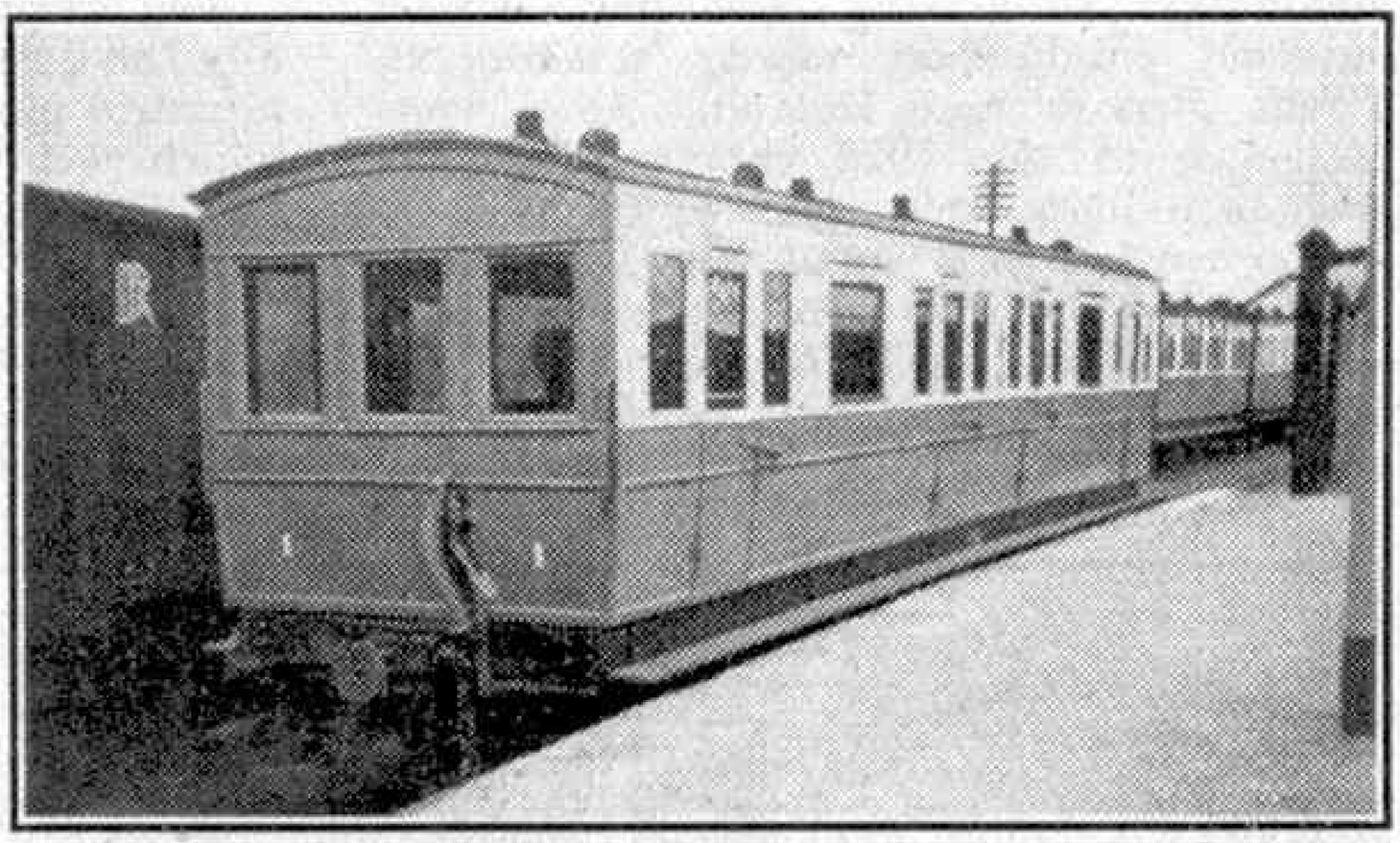
The body is panelled in aluminium on the outside, the inside being finished in a special hardboard the surface of which has an imitation Spanish leather effect. The luggage rack which runs along each side and also above the rear seat has been increased in width, and water heating pipes run the full length of the car. These pipes are connected to the engine cooling water system, rubber pipes being used to allow for the articulation. "Airvac" ventilators with chromium-plated interior grids are fitted in the roof.

The radiator is in the normal position in the front, as the car runs one way only. Thus a turntable has to be visited at each journey's end and on page 497 of this issue there is a view of the new car about to be turned. The car includes a quick-release brake which makes use of a vacuum chamber, allowing a number of brake applications and releases to be made without "revving up" the exhauster.

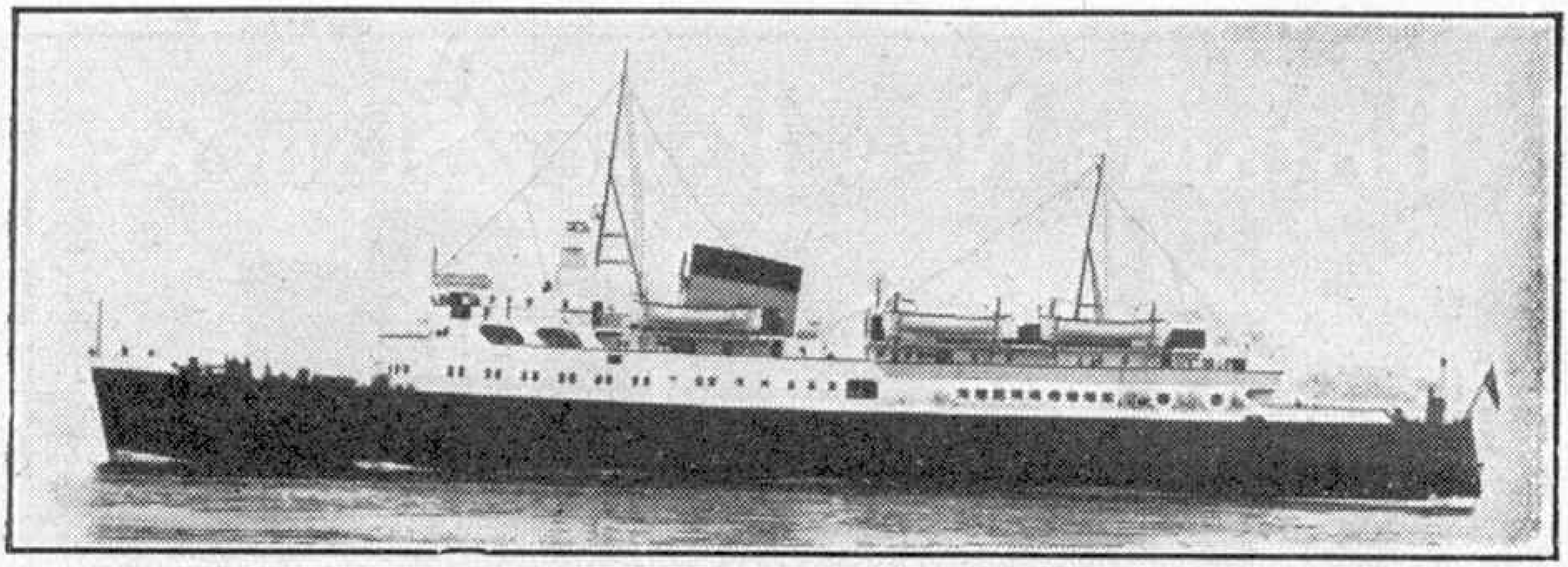
The "deadman" control handle operates through the throttle control. Thus the throttle handle, if released, goes to the shut position and in addition to operating the engine stopping lever it makes a full application of the vacuum brake. A pin is provided for locking the handle in the engine "idling" position.

Standard central type buffer, drawgear and side chains are provided at the rear, and a vacuum brake connection, as the vehicle is sometimes required to haul a passenger trailer and perhaps one or two wagons. A rear ladder and roof loading rack for luggage are fitted.

Observation vehicles with rear end windows were provided as long ago as 1909, and one of the accompanying photographs shows an observation car of traditional coach-built type. In addition to the vehicle illustrated there are several other cars of lighter construction that are more suitable for running in conjunction with diesel railcars than the coach illustrated. Observation cars are regularly conveyed on certain services between Stranorlar and Strabane, and they are used also as required by traffic. These smartly-kept and somewhat unusual vehicles afford a particularly good view of the scenery. (*Continued on page 524*)



County Donegal observation car of traditional coach-built type showing rear end windows. Photograph by S. J. Carse, Dublin.



T.S. "Brighton"

New Vessel for Newhaven-Dieppe Service

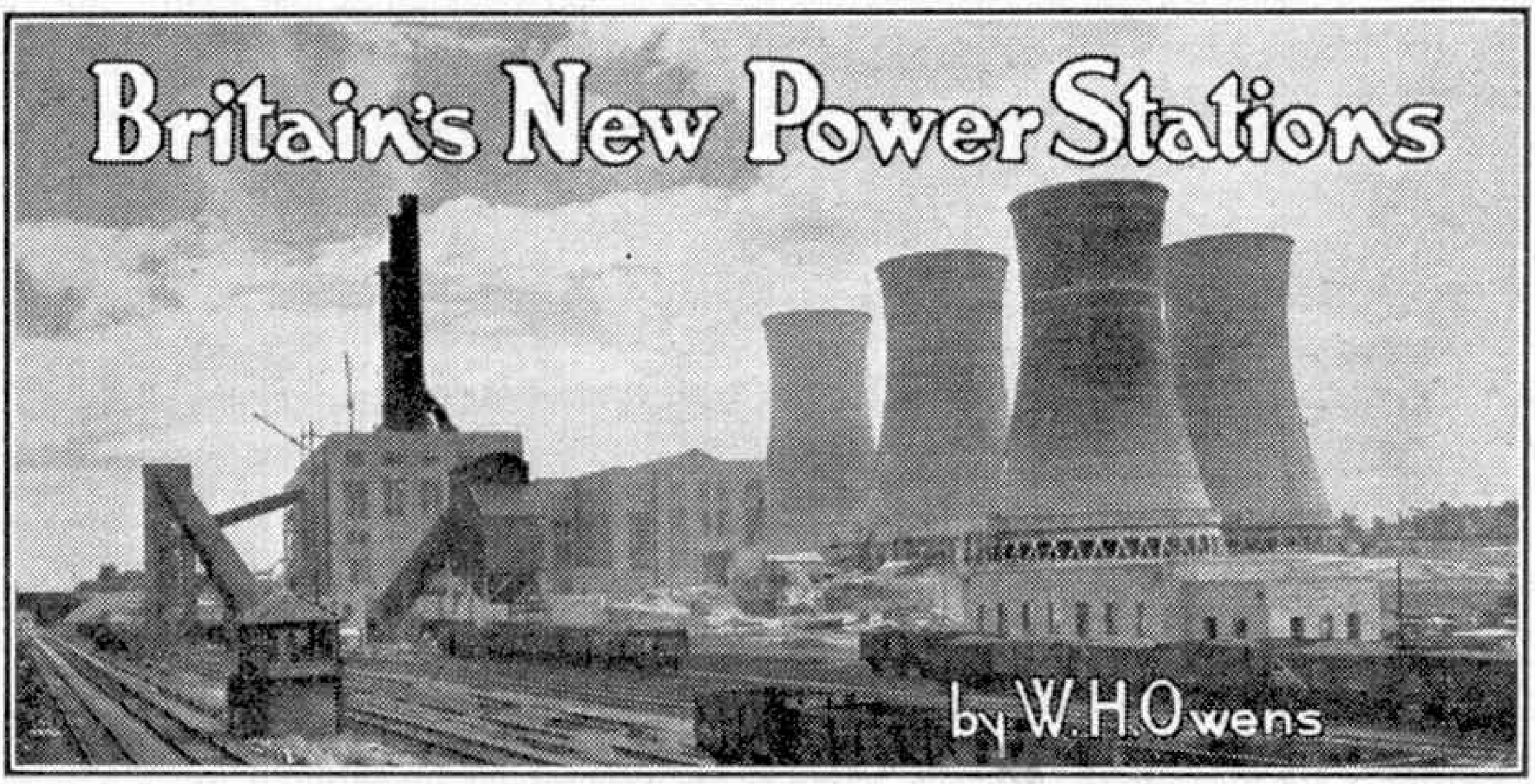
WHEN the steamship "*Brighton*" commenced service between Newhaven and Dieppe in June she was continuing a tradition that is 103 years old, for as far back as 1847 the London, Brighton and South Coast Railway gave this name to a small paddle steamer which they put into service on the route.

The new "*Brighton*," the sixth of her name to see service on the Newhaven-Dieppe crossing, was built by William Denny and Bros. Ltd., Dumbarton, who have supplied many vessels for railway services, including the fourth and fifth "*Brightons*." She is owned jointly by the Societe Nationale des Chemins de Fer Francais and British Railways, but is operated by the Railway Executive and is manned by a British crew. Her overall length is 311 ft. and her gross tonnage 2,875, while her draught when loaded is 10 ft. 6 in. She is designed to carry 1,450 passengers and has a crew of 74.

The vessel is of very smart modern appearance, as the illustration at the head of this page shows, with a raked stem and a cruiser stern. Features that immediately catch the eye are her two masts, for they are steel tripods, the first of their kind to be fitted to a cross-Channel steamer. Her large streamlined funnel also attracts attention. It is made of aluminium and is considerably more than a mere outlet for fumes from the boiler room, for within it are all whistle, waste and exhaust pipes, with air trunks to supply the boiler room forced draught fans, as well as the actual main funnel. This has a coned section near the top that increases the speed of the gases rising through it, forcing them high enough to be clear of the decks of the ship.

The "*Brighton*" has two screws, each driven by an all impulse type turbine with single reduction gearing. The turbines are of the latest design of the Parsons and Marine-Engineering Turbine Research and Development Association. They develop a total of 18,500 s.h.p. which gives the vessel when fully loaded a service speed of 24 knots. Steam pressure is 450 lb. per sq. in., and its temperature 650 deg. F.

The illustration at the head of the page shows the cross-Channel steamer "Brighton," introduced on the Newhaven-Dieppe service in June last. The restaurant in this new vessel is seen in our lower picture. Photographs by courtesy of British Railways.



I. Walsall

THIS is the first of a short series of articles describing some of the big new power stations that have been put into commission by the British Electricity Authority since it took over all the nation's generating plant, and the Grid system of supply lines, in April 1948. Altogether 38 new stations are to be built, and new plant is to be installed in 43 existing stations, under a four-year plan to increase Britain's power supplies by nearly half. The completion of this great building programme will mean the end of power cuts.

Ever since the war, as everyone knows, this country has suffered the strain of a severe power shortage. During cold winter spells this has amounted to as much as a fifth of the total generating capacity of all power stations throughout Britain. This is a direct consequence of the war, for while no new power stations were allowed to be built from 1942 onward, electricity demands increased very considerably each year. Indeed, over the period of 10 years from 1938 to 1948, power consumption in the United Kingdom very nearly doubled itself.

The new station at Walsall, the first to be dealt with in this series, comes under the Midlands Division, fourth largest of the 14 areas of British Electricity operations. These cover the whole of Britain except the North of Scotland, where the North of Scotland Hydro-Electric Board is responsible for the generation of power and its distribution. The Midlands Division embraces 5,000 square miles spread over six counties, including some of the biggest industrial areas, and the total annual output of electricity here exceeds 40,000,000 units.

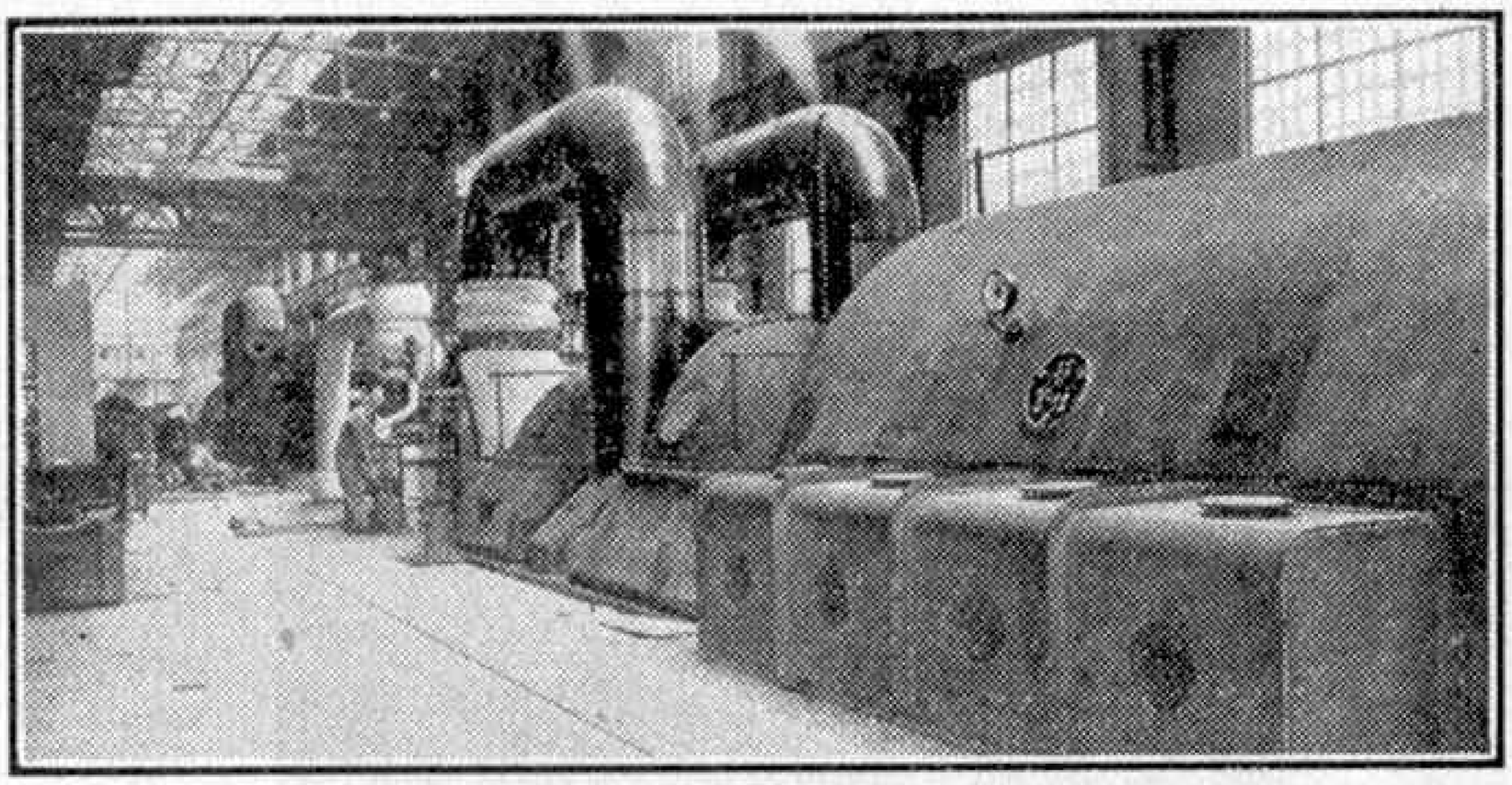
The design and construction of Walsall power station was actually put in hand by the former West Midlands Joint Electricity Authority in 1944, and work on the project was well advanced by the time that British Electricity took over control. Progress was maintained without interruption, and the buildings were opened officially on 30th September 1949.

At the head of the page is a general view of the new power station of the British Electricity Authority at Walsall. This is one of 38 new stations to be built under a four year plan, a scheme that with the installation of new plant in 43 existing stations will increase Britain's power supplies by nearly a half.

When a new power station is planned, three primary factors must always determine where its site shall be. There must be a good water supply for condenser cooling; ready access for fuel supplies by rail, canal barge or coastal collier, and proximity to the electrical load. At Walsall the new buildings, which lie just to the west of the old power station, are conveniently sited between a main railway line and the Wyrley and Essington Canal.

Modern power stations are building jobs on a vast scale, and use up thousands of tons of structural steel, huge quantities of concrete and millions of bricks. Thus the present power station expansion programme is keeping a wide variety of important British industries busy. Foundations must be bigger than those of almost any other building, because of the weight and power of modern generating plant. For example, before laying the foundations at Walsall 300,000 cubic yards of material had to be excavated.

An efficient coal-handling plant is the basis of a power station's operational capacity. When it is fully working, Walsall will consume every week round about 8,000 tons of coal, brought in by rail and canal. The coal plant provides direct conveyor-belt transit from rail wagon or barge to the station's boiler bunkers at the top of the building. With the use of two mechanical wagon tipplers, coal is borne from wagons to bunkers at the rate of 200 tons per hour. Barges are unloaded by two electrically-operated handlers, which deliver the coal into a receiving hopper and, via the conveyors, to the bunkers at the rate of 90 tons per hour.



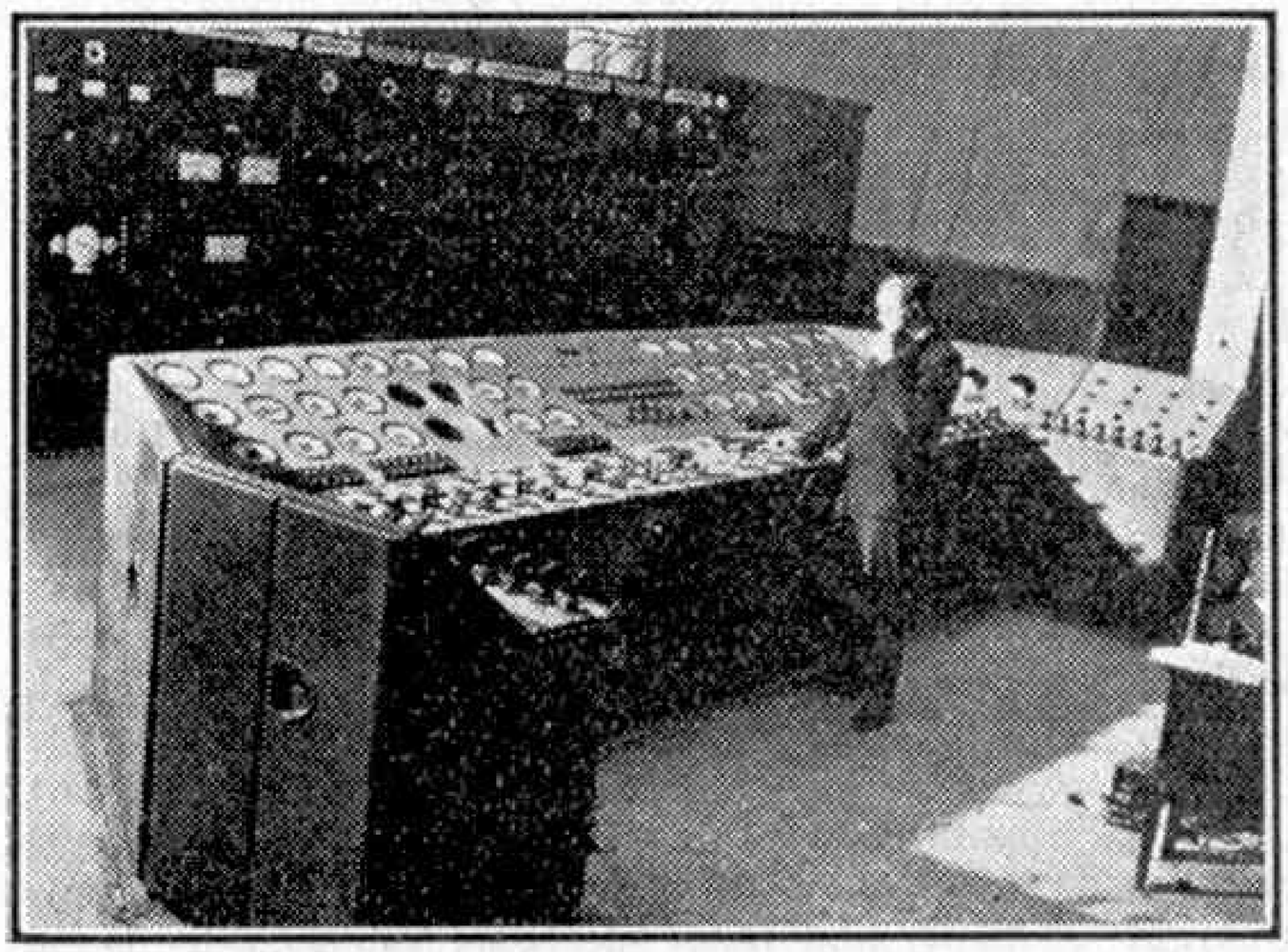
The turbo-alternators in the Walsall power station. The six generating sets to be installed will generate a total of 180,000 kW.

Coal from wagons or barges travels to the bunkers in three conveyor stages. First it is lifted by pairs of twin belts to the main junction tower, where it is picked up by another similar pair of belts and taken to a central point outside the boiler house. Finally, it is delivered by shuttle conveyors which are reversible and so can discharge the coal at any desired point in the bunkers.

The station's coal store has a capacity of 135,000 tons, and is spanned by a travelling transporter that receives and deposits coal on the store, and also lifts it to a conveyor for delivery to the bunkers. In all, there are approximately 8,000 ft. of conveyor belts.

A total of 12 huge high-pressure boilers is to be installed at Walsall for producing steam to drive the turbines of the generating sets. These will have a maximum evaporating capacity of 2,160,000 lb. of steam per hour, the steam entering the turbines at 650 lb. per sq. in. pressure and at 875 deg. F.

All waste gases from the furnaces are discharged through steel chimney stacks of 12 ft. internal diameter, which soar 160 ft. above the roof of the power station. Boiler ashes are handled by a paddle ash system, which quenches the ashes and discharges them on a belt conveyor under each line of boilers. Many hundreds of tons of ashes must be disposed of weekly, and all this waste is tipped on to low-lying ground close to the station.



The control panel at Walsall, where electrical conditions at any moment are revealed at a glance to the control engineer.

The heart (Continued on page 524)

Electronic Flash Photography

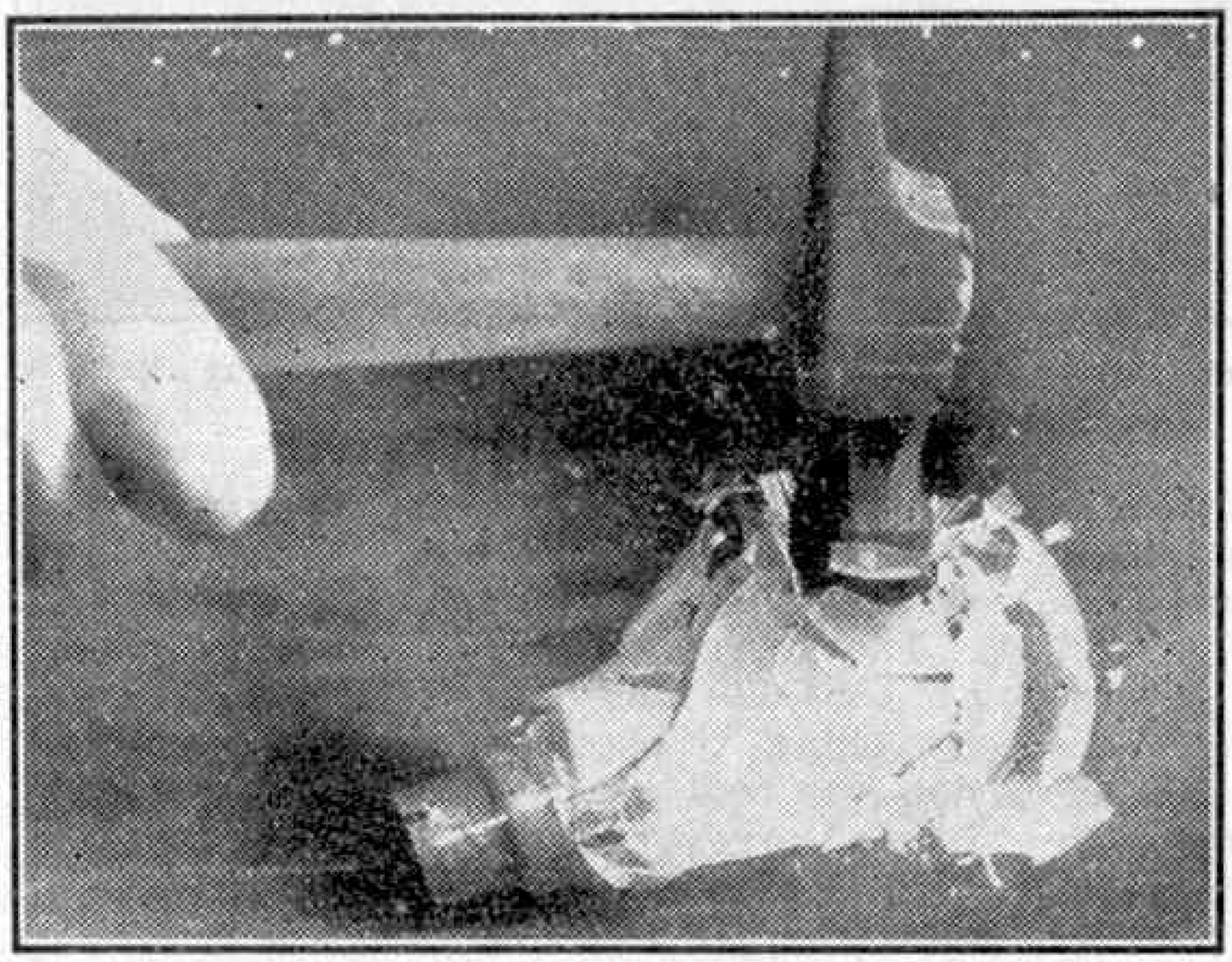
By Arthur Nettleton

MOST snapshotters know that to "freeze" fast-moving subjects on to a plate or film a fast shutter speed is necessary. The greater the speed of the subject, the faster the shutter must work if the resulting photographs are to be without blur. A fast moving object may require an exposure as brief as a thousandth part of a second.

Such rapid photography, however, seldom gives the film enough time to record the subject unless brilliant illumination is used. Only on the brightest days out-of-doors can ultra-rapid photography be tackled successfully by natural lighting. For indoor work, such as scientific photography, a high-powered artificial light must be employed. To "freeze" a flying bullet on a camera plate the exposure must be cut to no more than a millionth of a second, and although other fast-moving subjects do not require quite so short an exposure, many do need one so brief that to illuminate them sufficiently during that instant presents a big problem.

In the past this difficulty was partly met by the magnesium flash bulb, which is a glass globe containing magnesium foil, the foil being ignited at the right moment by a low-powered electric charge from a battery. Such bulbs are still widely used, but they have inherent drawbacks. For instance, each bulb gives but a single flash, and must be replaced with a new one for the next photograph. Further, the flash is not brilliant or brief enough for the exacting needs of ultra-rapid scientific photography to-day.

Electronic flash photography, as the new system is called, is a considerable advancement. A single electronic flash bulb will give approximately 10,000 flashes before it has to be replaced. The duration of the flash too is shorter than that of a magnesium flash bulb, being roughly one 6,000th of a second. This is brief enough to "freeze" movement of any speed, except the flight of a bullet, on the negative with pin-point clarity. Pictures taken with the older type of flash bulbs, which do not permit such rapid shutter speeds, invariably show traces of blur.

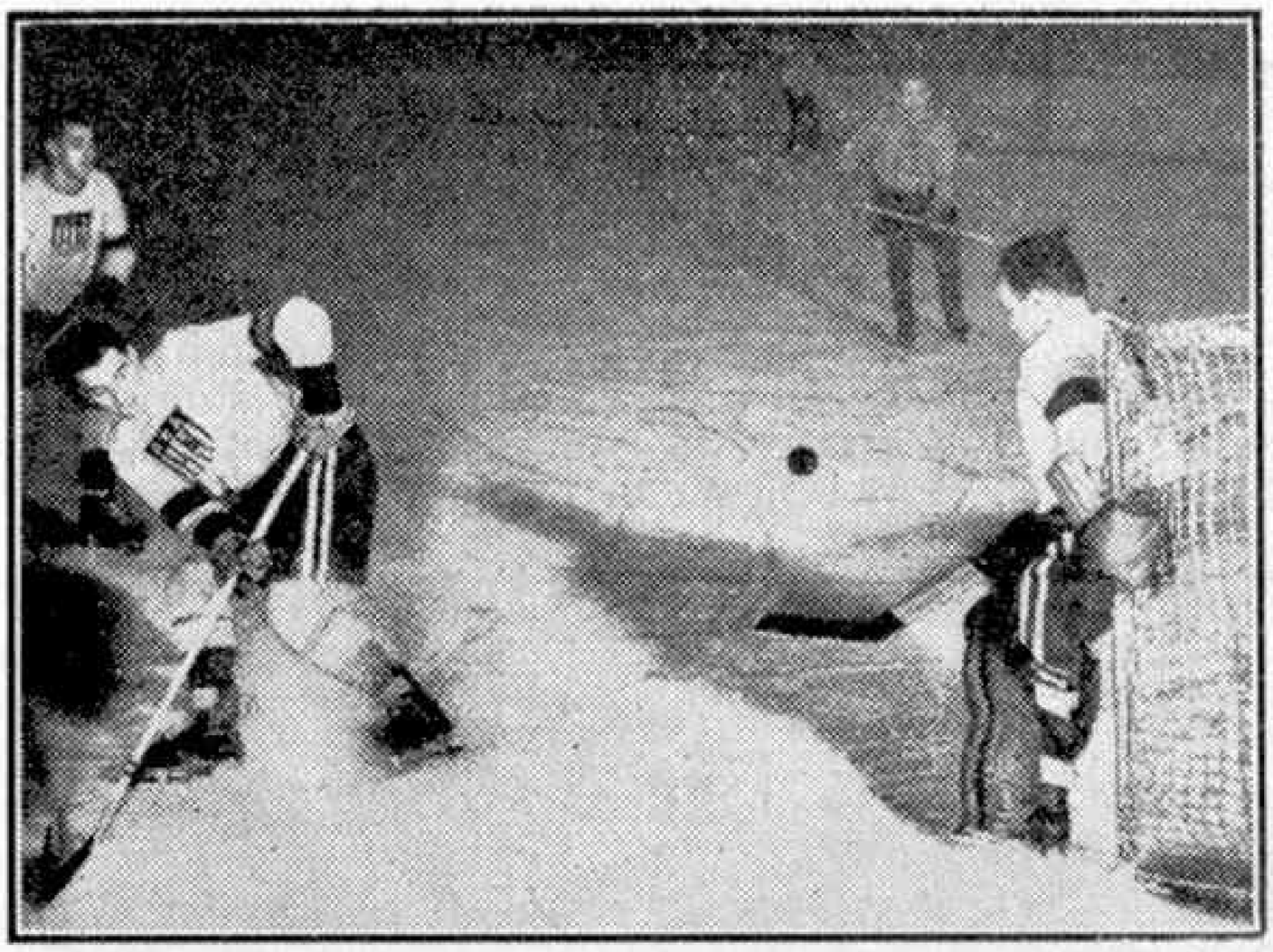


The breaking of an electric bulb can be "frozen" by electronic flash illumination, allowing photographs such as this to be taken without difficulty. This illustration and the upper one on the opposite page are reproduced by courtesy of Siemens Electric Lamps and Supplies Ltd.

Again, the electronic flash-lamp is the only light source which will give repeated flashes of exactly the same intensity. The first and the last flashes of the flash tube have exactly the same light power. Other advantages are that virtually no heat is emitted from the lamp, so that this new method of artificial light photography can be used in hospitals and for other work where heat would be inconvenient; and that the light, being "soft," does not give the hard shadows which often make other types of flash photograph look unreal.

How does the electronic flash tube work? The term "man-made lightning" is apt, for the flash can be compared with the lightning flash, and is produced in a similar way by artificial means. In lightning the brilliant light is caused by the passage of a great voltage of electric current through the atmosphere; in the electronic flash by its passage through a rare gas contained in a flash tube.

In the latter case the necessary current is built up in a condenser from the mains supply, or from a small-voltage accumulator, and then suddenly released to cause the flash. The principle may be likened to that of a motor car ignition system,



Photography of ice hockey and other swift indoor sports has been greatly simplified by electronic flash equipment.

where the current from the batteries is stored in a condenser and then released to flash across the spark points of the sparking plug in the cylinder.

A car ignition system fires in rapid succession, however, and the build-up in preparation for each spark is comparatively small. In an electronic flash circuit the interval is increased to about 15 seconds, and during that time the voltage in the condenser may grow to 2,500.

The flash tube in general consists of a long slender tube of glass or quartz. The gas inside this is usually xenon, the most rare of all inert gases, which helps to produce a flash very similar to daylight.

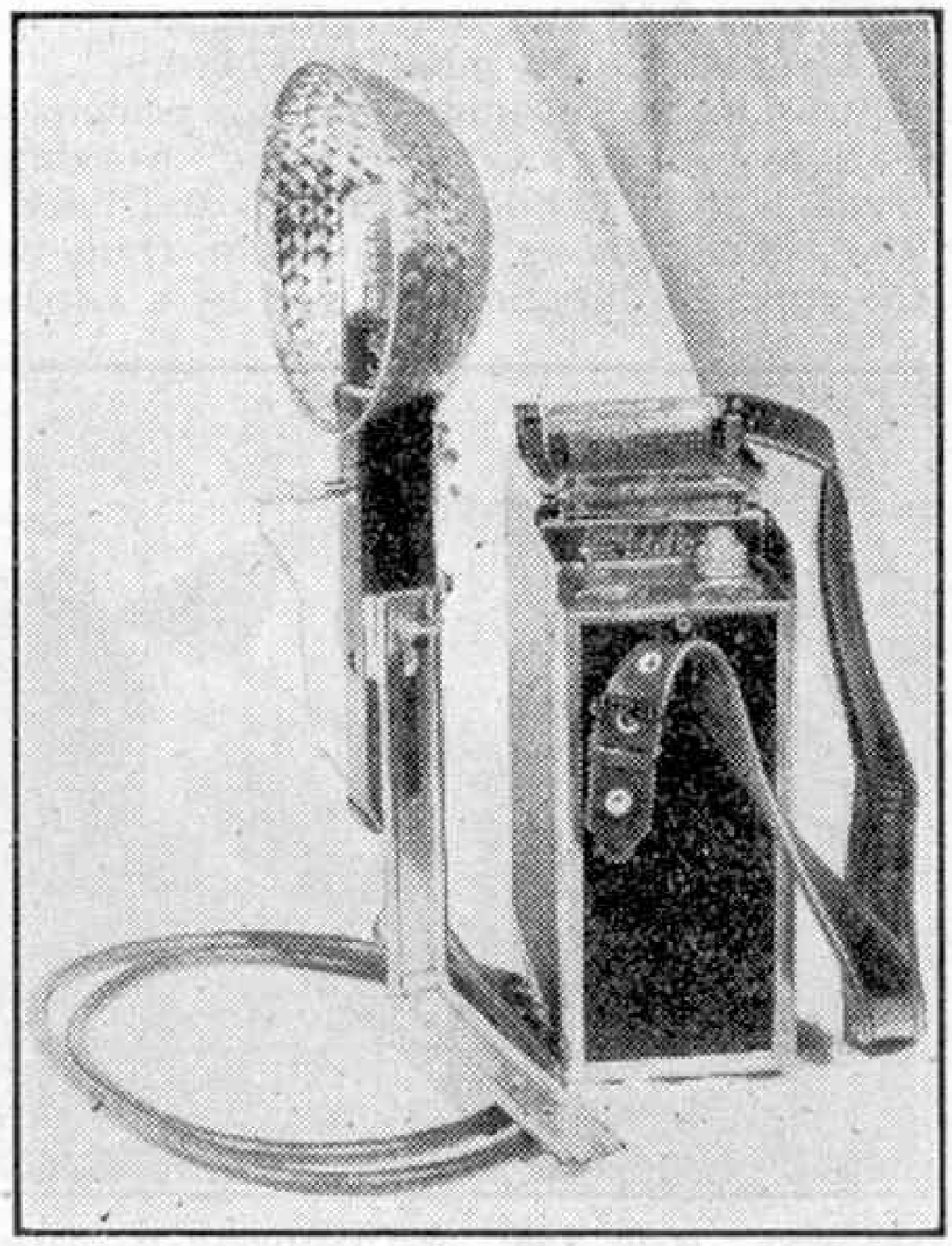
The possibility of using an electric spark to illuminate a fast-moving object and enable it to be photographed was actually recognised nearly 100 years ago, Fox Talbot, the pioneer of photography, having taken out a patent for this method in 1851. But investigations in this direction did not pass from the experimental stage until 1931, all the earlier inventors being handicapped by the fact that the light source could not be made more powerful.

Great progress was made in the 1930s, and early in the war the electronic flash was put to use by the R.A.F. Equipment capable of producing flashes equivalent in intensity to the combined light of a million 60-watt lamps were then installed in some aircraft for photographic reconnaissance at night.

Naturally, heavy installations were necessary for these ultra-powerful flashes, and only big aircraft could be employed on such operations. Equipment weighing 5,000 lb. was not unusual, and in many cases the aircraft had to be stripped of other equipment, even the armament. On the other hand, the extremely brief duration of each flash made it impossible for the enemy to locate the 'planes by "tracking" the flashes.

Since 1945 rapid progress has been made in adapting electronic flash photography to commercial activities and scientific research. Small units have been made available, some of them being light in weight and transportable, while others are intended for use in studios, laboratories, and hospitals.

The smallest units are battery-operated, run from a 4-v. accumulator, and these are being increasingly used by Press and commercial photographers who wish to obtain perfectly sharp photographs of fast-moving subjects such as stage "turns" in action. Crowd scenes also have been taken out of doors at night by means of electronic flash equipment, and remarkable night photographs of birds and other denizens of the wild have been obtained.



A portable electronic flash unit run from a small accumulator. Photograph by courtesy of Dawe Instruments Ltd.

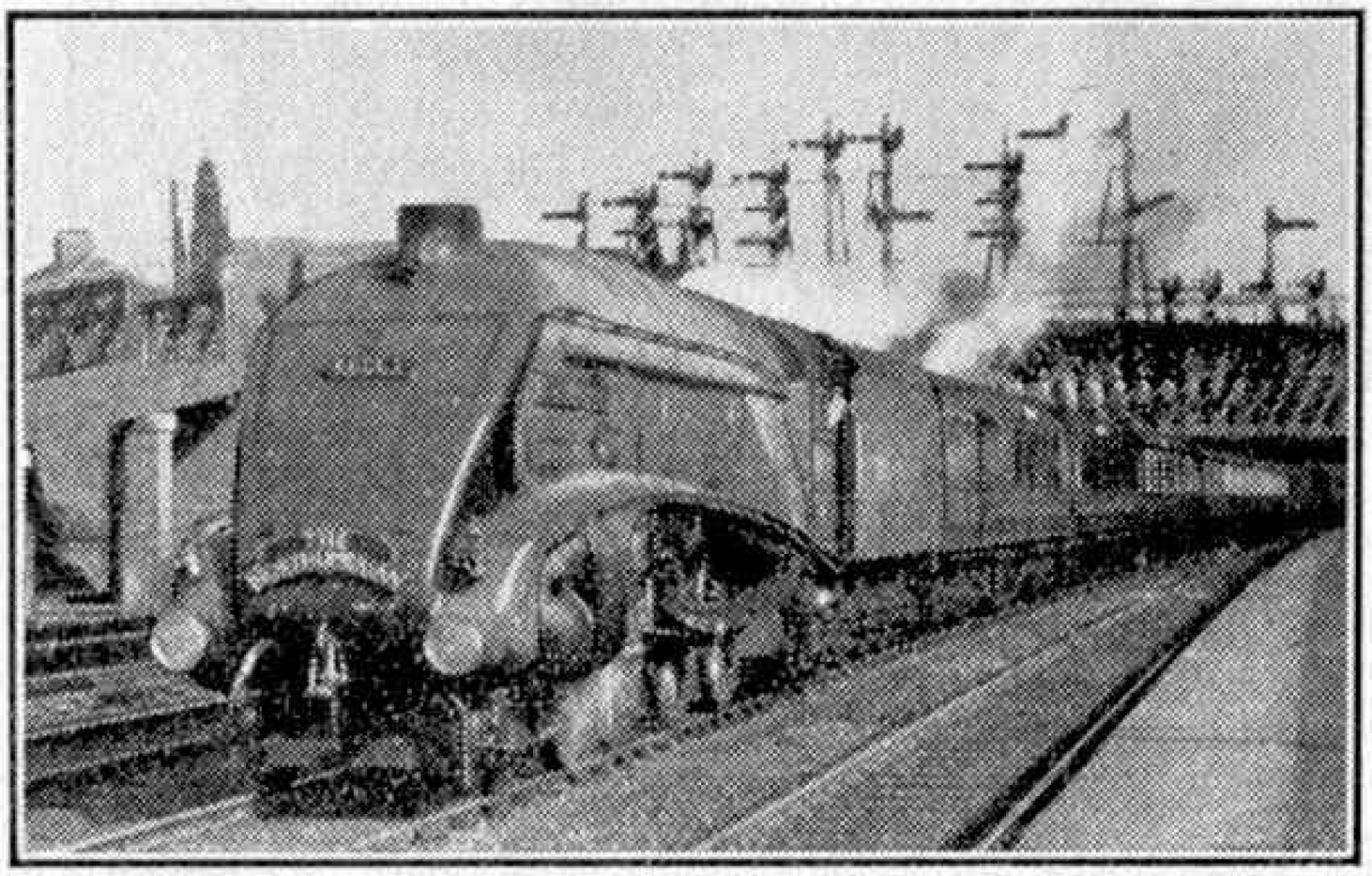
Named Expresses

Eastern and North Eastern Regions

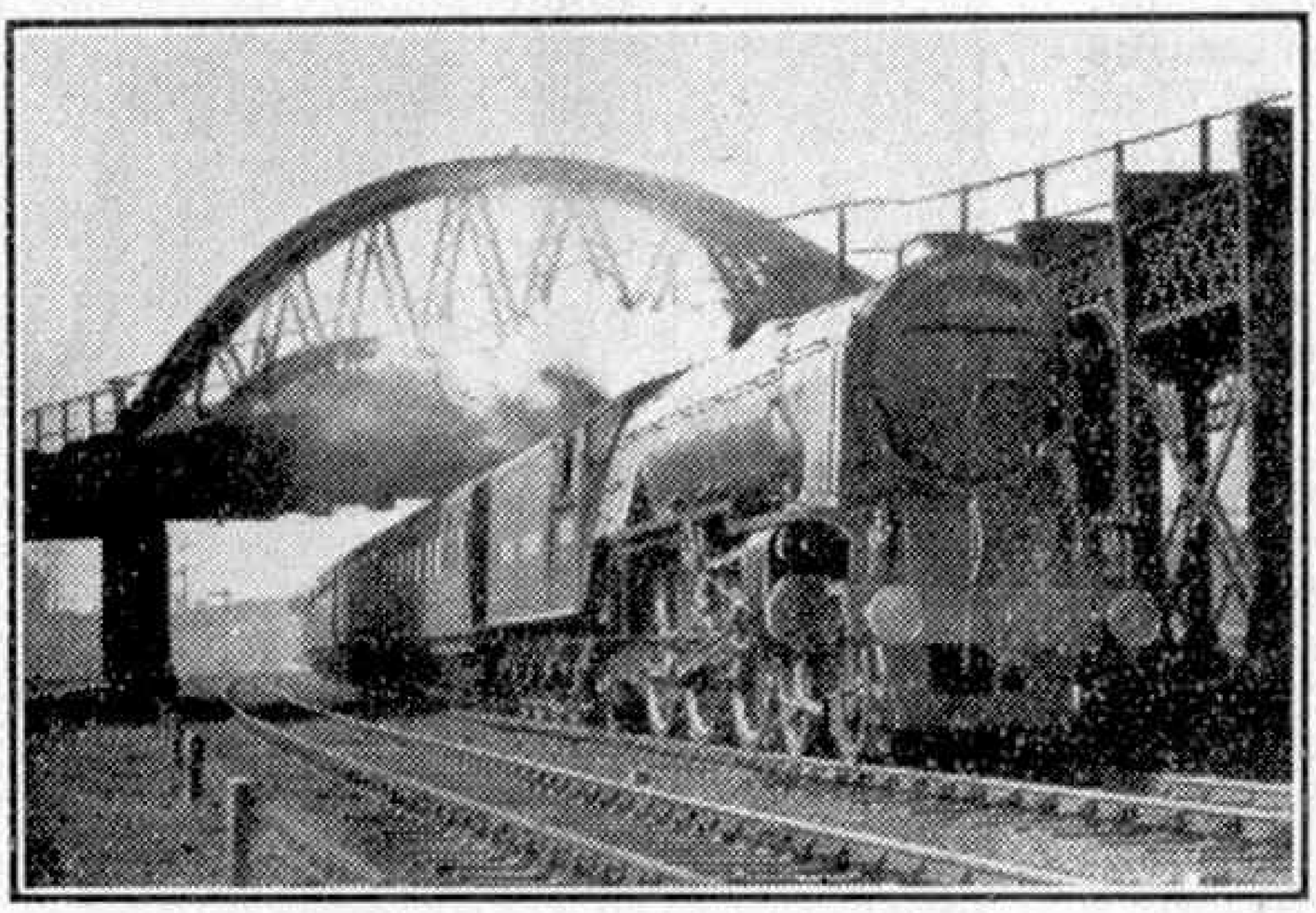
By R. A. H. Weight

UNTIL about 25 years ago officially named trains were few in Britain, but the idea is undoubtedly popular and considerable enterprise in this respect was shown particularly by the former L.M.S. and L.N.E. Railways. Since the restoration of normal services after the recent war, with improving speeds and other amenities, several interesting new titles have appeared on the Eastern and North Eastern Regions, together with a revival of older ones. Let us look at the schedules and see what some of the newly-named restaurant expresses actually do. Details are from the 1950 current timetables.

The *"White Rose"* is the principal earlier morning service from King's Cross to Leeds and Bradford, leaving at 9.15 a.m. and running non-stop to Doncaster, 156 miles in 174 min. It returns in the evening, serving principal stations, a King's Cross "Pacific" working through from London to Leeds and back. The *"West Riding"* is a similar train in the opposite directions, hauled by a Leeds (37B) engine, running southward as a breakfast-car express without stop from Doncaster to King's Cross, arriving at 11.47. On the northbound trip at 3.45 p.m. a longer run without halt is made, to Wakefield, 175¾ miles, and Leeds is reached in about 3¾ hrs. This is similar to the *"Yorkshire Pullman,"* which has a King's Cross engine to Leeds. The latter is allowed only 3 hrs. 46 min., including stops at Doncaster and Wakefield, but the *"Queen of Scots Pullman"* which goes north from King's Cross at midday in charge of Leeds locomotive and men takes 3½ hrs. non-stop.



The southbound "Northumbrian" leaving York for London. The "A4" locomotive is "Andrew K. McCosh," working through from Newcastle to King's Cross. Photograph by C. Ord, York.



The down "White Rose" near Harringay, in charge of "A1" 4-6-2 No. 60120, now named "Kittiwake." Photograph by F. R. Hebron, London.

The *"Northumbrian"* links Newcastle with London by day, also serving Darlington, York and Grantham. The *"Tynesider"* provides a sleeping car service by night. The *"Tees-Tyne Pullman"* runs up from Newcastle in less than 5¼ hrs., covering the 232¼ miles between Darlington and King's Cross at 57 m.p.h.

Named expresses on the G.E. Region include the *"Scandinavian," "Day Continental"* and *"Hook Continental"* boat expresses. All carry locomotive headboards.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"MOTOR-CARS, RAILWAYS, SHIPS AND AEROPLANES"

(Odhams Press. 8/6)

This entirely new work is literally packed with information and pictures, and in this respect it certainly lives up to its description as a "Complete Book." Its subjects are the latest development in transport by land, sea and air, with examples from the Commonwealth, Europe and America as well as Britain. Illustrations are plentiful and satisfying; they include 70 pages of "how it works" drawings showing how many types of engines and vehicles operate.

The railways section comes first. It contains concise and accurate accounts of locomotive types and classes, and of their construction, with special sections dealing with diesel-electric and electric developments. Signalling and control are fully dealt with, and there is a section on the most up-to-date designs on rolling stock.

Those marvels of power and speed, modern British motor cars, introduce us to the second section, in which we learn how a motor car works and how it is tested. Record breaking and racing also are dealt with, and the prospects of jet and turbine motor cars are carefully examined. The section on ships, by Mr. Frank C. Bowen, a regular contributor to the "*M.M.*," is planned on similar lines. We see how the coming of the steam engine changed conditions at sea, and the story is brought right down to the latest records, not only those created by giant liners, but also those achieved by small vessels driven by internal combustion engines. Types of marine engines, the planning of accommodation on large liners and the design and building of ships provide Mr. Bowen with splendid opportunities of telling other good and interesting stories.

Finally comes a section in which we have descriptions of typical aircraft, including the Bristol "Brabazon," with accounts of navigation aids and other devices that help to make the sky routes safe, and of the giant engines installed in modern aircraft. This section ends with the stories of jet and rocket 'planes.

"THE SOUTHERN RAILWAY 1923-1947"

By R. A. Savill (Oakwood Press. 4/6)

This booklet is a record of events in the life of the Southern Railway from its formation in 1923 to nationalisation in 1948. It deals only with railway matters, marine or docks activities being excluded.

The chronicle begins with notes on the lines forming the Southern, and here brief details are given of the main line companies absorbed and the subsidiary concerns that were included. Other sections deal with routes opened and closed during the period, and with the spread of electrification. Stations are the subjects of the next section, and then we have an outline of Southern motive power, both steam and electric. Lists of Southern named trains and details of joint lines and running powers complete the booklet, which is illustrated on a generous scale.

"TRACTION ENGINES WORTH MODELLING"

By W. J. Hughes (Percival Marshall, 12/6)

There are few steam engine enthusiasts who have not a special affection for the steam road traction engine. At one time these big machines were a common sight on the roads, and they are still encountered occasionally. They make excellent subjects for model makers, and it is for the benefit of those who follow this fascinating hobby that this book has been written.

Quite apart from the modelling interest, the book will be found of great interest by all for whom the steam road locomotive has an appeal. More than half the chapters in the book deal with the general construction of the steam traction engine, each section of its make-up being considered in turn, with special reference to its reproduction on a working model. The remaining chapters deal with what might be termed the standard engines of some of the firms building these giants of the road. The homely steam roller has a chapter to itself, and special attention is given to the "Farmer's Engine" of just over a hundred years ago that was the ancestor of all the road engines that have followed.

Drawings and photographic reproductions add point to the extremely interesting text. The attractive coloured jacket depicts a showman's traction engine, probably the most highly developed form of road engine, in all its glory of gleaming paint and burnished brasswork.

"PHOTOGRAPHY FOR BOYS AND GIRLS"

By S. W. Bowler

(English Universities Press. 5/-)

Amateur photography has regained much of its pre-war popularity now that cameras and films are more plentiful, but many enthusiasts miss a great deal of fun and enjoyment by entrusting the developing and printing of their negatives to others. This is an easy way, but an expensive one. After all, it does not take a great deal of "swotting" to learn enough about photography to be able to get better pictures with less waste of film, and it is not a difficult step from exposing the film to developing and printing it for yourself. Mr. Bowler's book, one of the excellent "Junior Teach Yourself" series, shows how. It has been written to help the amateur photographer to master each stage of the hobby and to enjoy doing so, and it certainly fulfils its author's hopes. It is simply and entertainingly written, and the instruction it gives is amplified by many excellent photographs and line drawings.

"THE LIVE STEAM BOOK"

By "L.B.S.C." (Percival Marshall. 12/6)

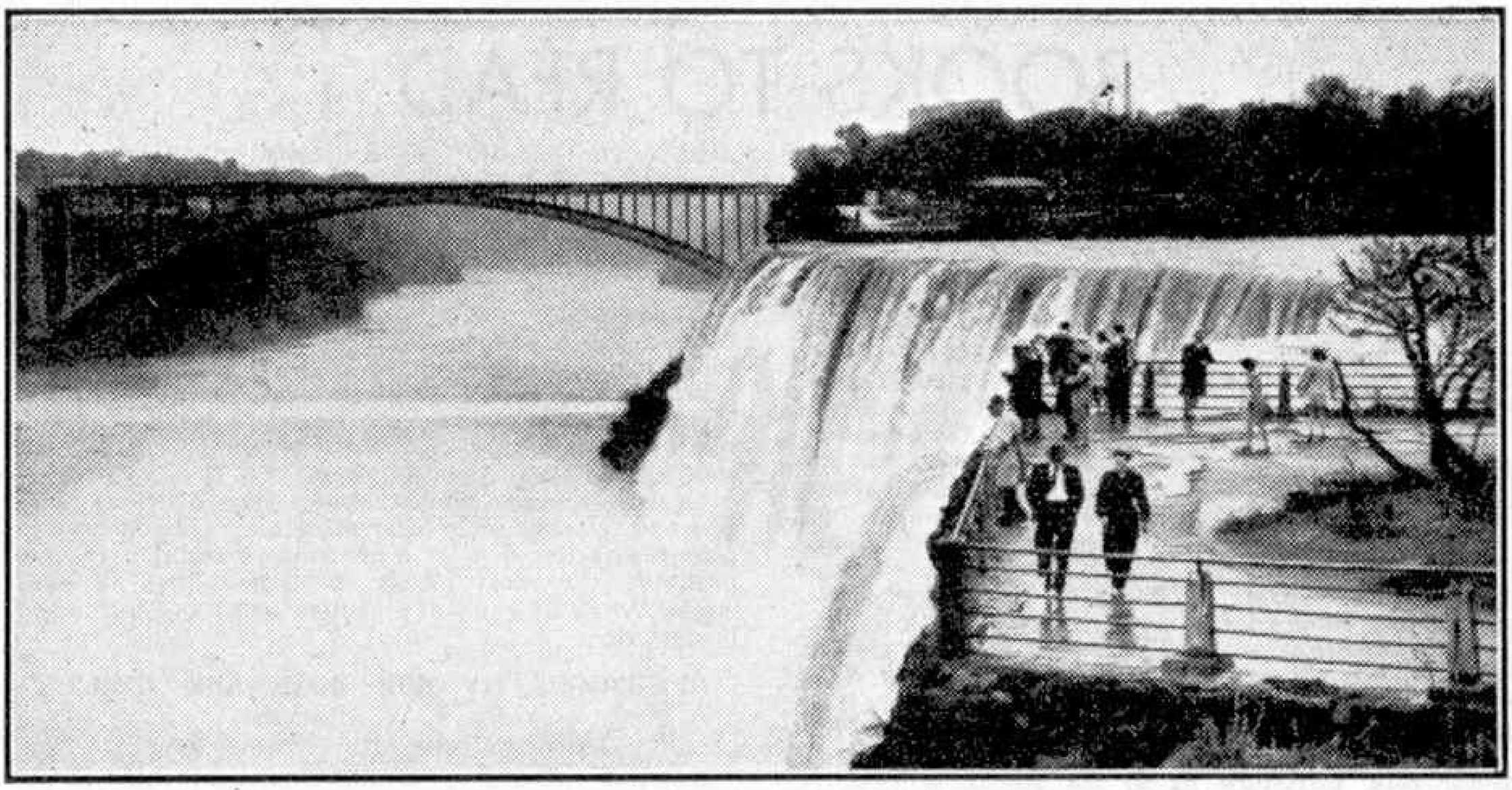
The pen-name of the author of this book will be familiar to those readers of the "*M.M.*" who are "live steam" enthusiasts, from his contributions on this topic to "*The Model Engineer*." The miniature steam locomotive as championed by him is a small edition of the real thing, a coal-burner for preference, with all parts and accessories designed and constructed in a manner that ensures satisfactory performance. His present book deals with the construction of different sections of such a miniature locomotive. The information given is thoroughly practical, for all the schemes detailed are the result of the author's own experiences. Descriptions are plentifully illustrated by drawings, and there are also photographs, including one showing "*Ayesha*," the author's 2½ in. gauge Brighton "Atlantic," now nearly 30 years old and still capable of much hard work.

"THE BOYS' BOOK OF SOCCER"

(Evans. 10/6)

Now in its sixth year, this excellent annual provides a store of good things for the Association football enthusiast. In it there are articles on famous clubs and on Cup and league struggles of the past, international matches and the World-Cup contest in South America. In addition there are features on playing the game, tackling, heading, throwing in, captaincy and the control of the game, with stories, training hints, puzzles and games.

The illustrations are particularly noteworthy. There are 75, all from specially chosen photographs of famous players in action, with coloured portraits of five leading stars of the game.



The Romance of Bridges

By Bernard Llewellyn

EVER since civilisation began there have been bridges, though the earliest ones were no more pretentious than those you can find to-day in the Amazon forests, a swaying liana strand or two fastened to a tree trunk on each side of a river.

Nowadays man's ambition is not content with spanning narrow streams. There are huge steel bridges across the Firth of Forth and across the deep waters of San Francisco Bay; giants that capture the imagination just as many of the smaller but beautifully designed bridges have done.

The Chinese are a people with a gift for building bridges. Two of the loveliest were built in the Summer Palace outside Peking. One is the famous Camel's Back Bridge, over whose marble hump the retinue of an empress once walked. The other is the Bridge of the Seventeen Arches which links the lake shore with the island of the Dragon King.

All over China you will find little bridges that enhance the beauty of the landscape. For instance, I think of a bridge in West China, built of wood and with the flowing upturned roof that one associates with Chinese buildings. It was typical of many; but as my vehicle passed beneath it I noticed four golden Chinese characters painted there, telling the world that it was the bridge of the Heavenly Horse and the Cloudy Dragon, a name that could but add enchantment.

Over the rapidly flowing Min River in Szechwan Province is a bridge with shops flanking its sides. In former times many bridges were lined with shops, including the old stone London Bridge that was in use from 1209 to the early 19th century. Many of the shops of this famous bridge were wooden and every now and again they would catch fire. In 1212 it is said that nearly 3,000 people lost their lives through crowding on to the bridge to watch a fire at one end. While they were on the bridge another fire started at the other end. Hundreds jumped to their deaths in the river; hundreds more died in the flames.

The illustration at the head of this page shows the Rainbow Bridge, Niagara, seen from above the Falls. The cascade on the right is the American Fall.

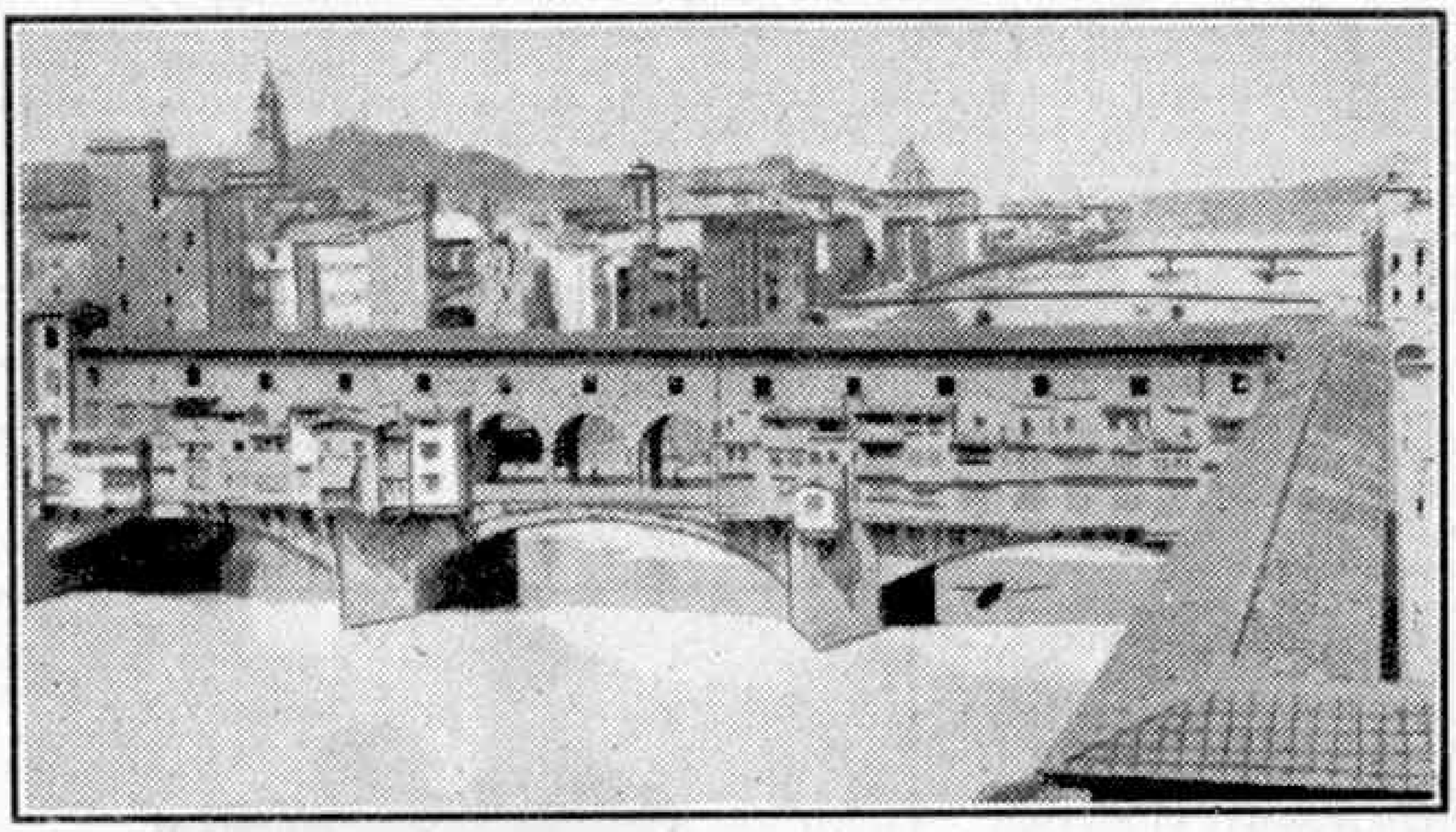
Perhaps the most famous mediæval bridge of shops still surviving is the Ponte Vecchio in Florence. Here the visitor can wander from shop to shop, and look out through the stone arches at the sunlit yellow waters of the Arno.

If the Ponte Vecchio has a rival, it is the Ponte Rialto in Venice, the little bridge that cuts the Grand Canal in two. This is the busiest and one of the most fascinating of all the 364 bridges of Venice. Here again you can shop on the bridge itself, or pause to gaze for a while at the life on the canal below you.

It would not be difficult to devote a whole article to the bridges of Venice. Mirrored in the placid waters of her canals, the quaint bridges, many rich in historical associations, have captivated visitors through the ages. In *"Childe Harold"* Byron wrote:

"I stood in Venice
on the Bridge of
Sighs,
A palace and a
prison on each
hand."

This Ponte Sospiri, as the Italians call it, is the sad link between the beautiful Doge's Palace and the prisons. Across it the condemned used to pass in crueller days to hear judgment passed on them. Now it is simply a piece of rather romantic history that every visitor with a camera likes to photograph.

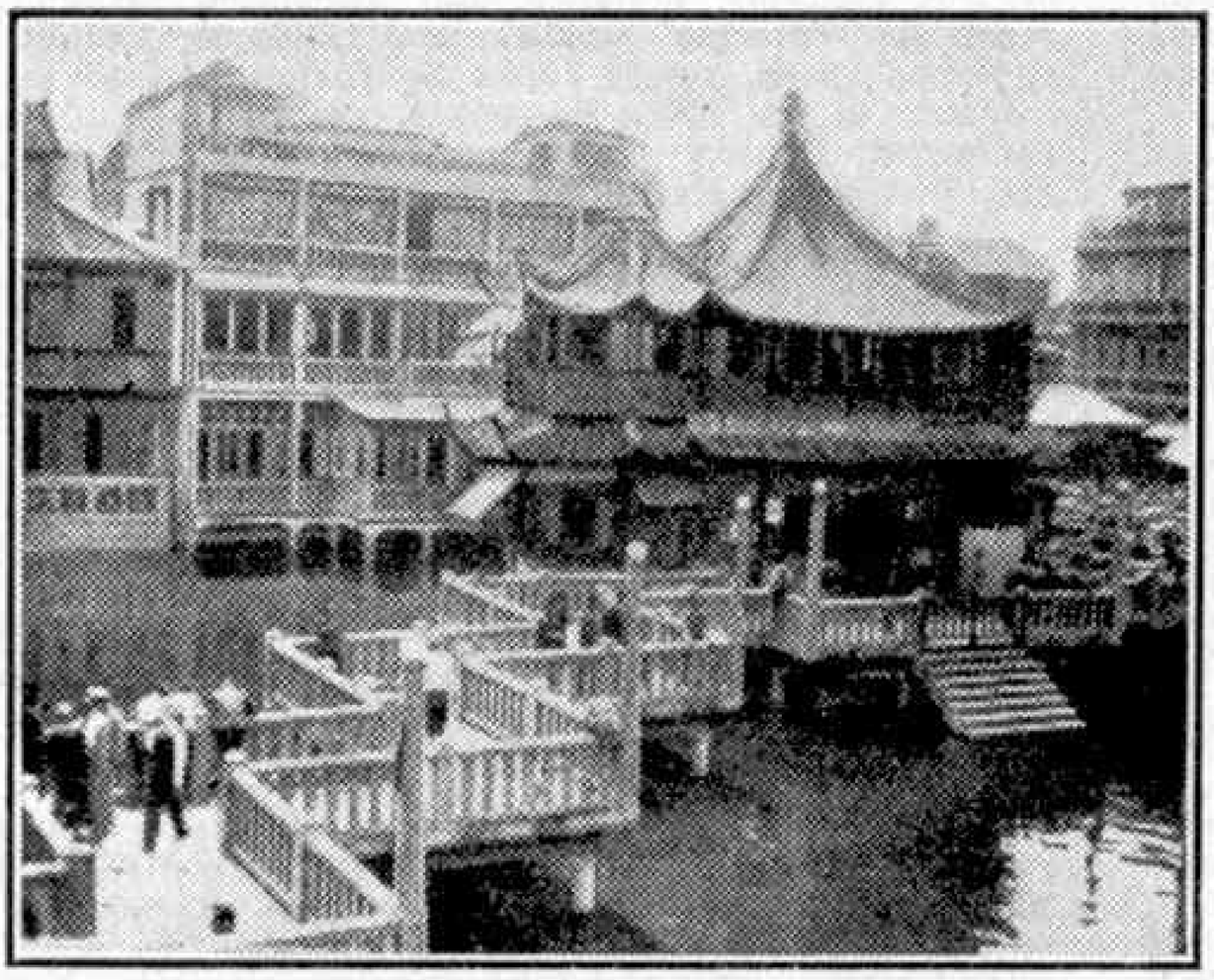


Ponte Vecchio, Florence, perhaps the most famous bridge of shops in the world.

Venice is linked to the mainland by two great bridges, one for vehicles and one for the railway, that run out over the lagoon to the hundred little islands on which the city is built. These lagoon bridges cannot compare with the railway bridge that formerly linked Florida with Key West across 110 miles of ocean. This engineering feat was made possible by the numerous islands along the route and by the extreme shallowness of the water over the Florida Reef. The viaducts withstood severe storms for nearly a quarter of a century before the train services to Key West were discontinued in 1935.

Even the steel bridges of our own century are not without interest and beauty, though they lack the charm of some already mentioned. Across the Niagara River, just below the Falls, is the fine steel arch of Rainbow Bridge, linking the United States and Canada. The arch, with a span of 940 ft., supports a four lane roadway for vehicles, from which tourists and the innumerable honeymooners that Niagara Falls attracts get an unsurpassed view of the great cataract.

This bridge stands on the site of the former Falls View Bridge, which crumpled up in the great ice jam of January 1938, after standing for 40 years. The river reaches a speed of 25 m.p.h. beneath the bridge and is over 174 ft. deep. It was thus impossible to build the Rainbow Bridge by using sub-structure. The 3,500 ton arch had to be supported from above by steel cables anchored to each shore until the last central section of the bridge was in place, and the supporting cables could be removed.



The approach to Shanghai's Willow Pattern Tea House is guarded by this devil-proof bridge.

Sailing into San Francisco Harbour you pass under the two greatest bridges ever built. These are the Golden Gate Bridge with the world's longest span of 4,200 ft., and the San Francisco—Oakland Bridge, which crosses five miles of bay where the water is more than 100 ft. deep. The story of their erection is an epic of bridge engineering.

Miles out to sea the lights of the Golden Gate Bridge at night mark the entrance to (*Continued on page 524*)

Railway Notes

By R. A. H. Weight

Winter Train Service Improvements

The completion of further stages in the comprehensive programme of track renewal and reconditioning has enabled a number of accelerations to appear in the winter British main line time-tables now in force. These are especially noticeable along the East Coast route between King's Cross, Yorkshire, the North East Coast, and Scotland. Other lines and areas also benefit. There has been a further development in the popular plan of starting and timing trains on a regular interval basis, suburban as well as long distance.

Improvements to the services between London, Birmingham and Wolverhampton, include a new express called the "*Midlander*" running up to Euston at mid-day and returning in the evening; the naming of the quickest Paddington-Birmingham service down in the morning, up in the evening as "*The Inter-City*," and a new train from Euston at 8.5 a.m. calling at Watford and Coventry. These are all restaurant car trains formed of modern coaches, running in most instances from Mondays to Fridays, with reserved seat facilities, which now apply on a larger scale in all Regions.

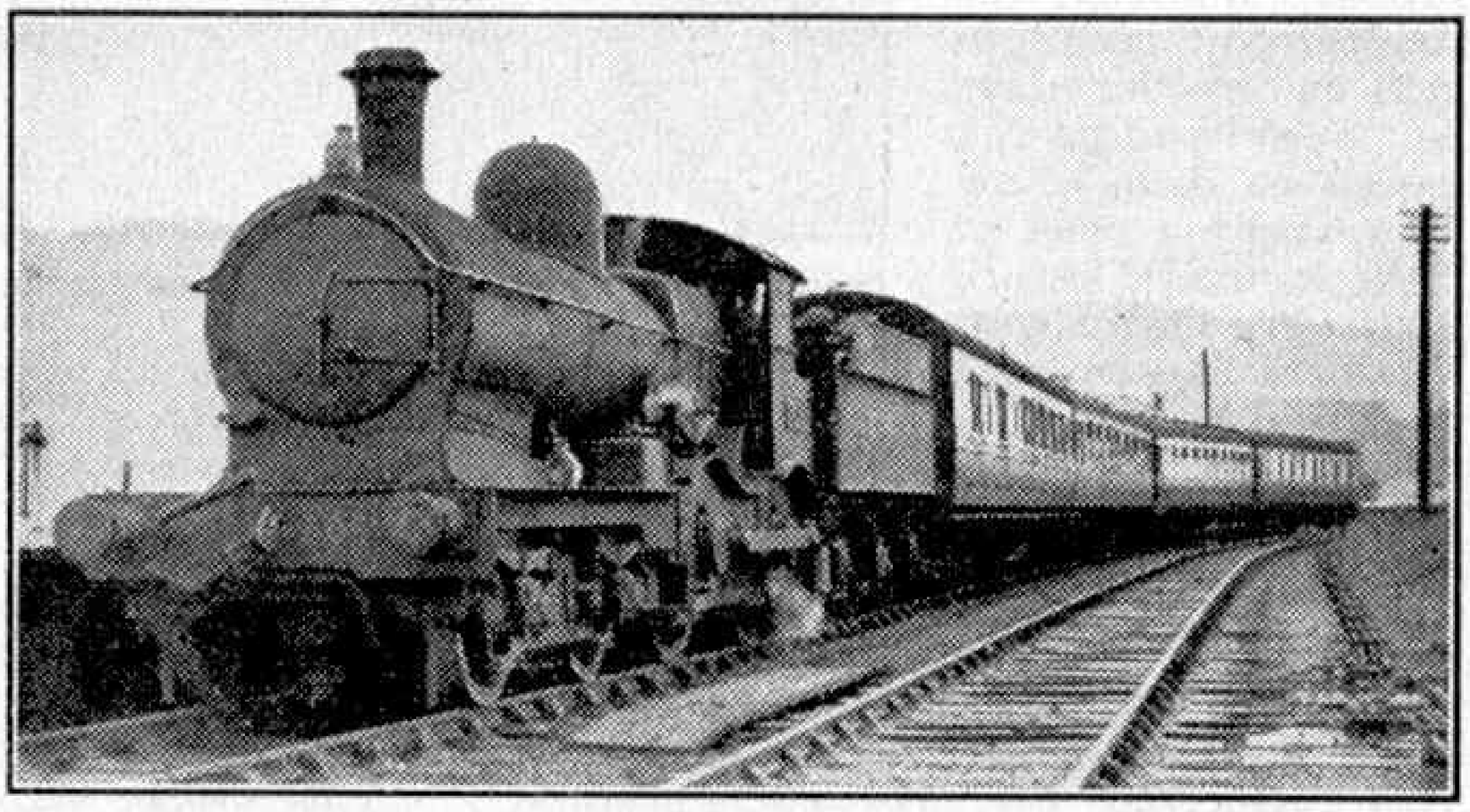
On the Western Region the "*Torbay Express*" has been accelerated, with improvements and additions to other services serving Bristol, Shrewsbury and elsewhere. The Westbury slip carriage is again carried at the rear of the 10.30 a.m. "*Cornish Riviera Express*" from Paddington, as in pre-war days, to provide a good connection to the Weymouth line.

Certain summer trains are being retained regularly on the Southern Region. The Railway Executive announce that excursion and cheap day tickets will be available on a considerable scale, and 120 buffet car services are being operated each week-day as well as restaurant cars on the same scale as last winter.

A number of new local or shorter distance trains are running in Scotland.

Telescopic gangways are capable of being traversed along the platform of the building in order that accurate alignment can be made with the various gangway ports of different ships. They allow loading and unloading of passengers to take place under cover in all weathers. These gangway assemblies swing away to the alignment of the building when out of use, thus giving freedom of movement for the batteries of cranes and other equipment.

The upper floor consists mainly of two splendidly appointed waiting halls, with customs examination halls adjoining. Every facility likely to be required by the arriving or departing ocean traveller is provided, including refreshment rooms, bank, telegraph office, telephone booths, information and news service, waiting and interviewing rooms. Baggage is landed and conveyed to the upper floor by quayside cranes and conveyors. Passengers and their luggage descend after customs clearance by lift or escalator to the ground floor, where a 1,000 ft. long island platform can accommodate two full length boat trains at a time. Large car parks are also provided. Visitors are able to watch the arrival or departure of a ship from a high balcony or roof level enclosure.



Barmouth-Dovey Junction train at Dovey Junction, with "Duke" class 4-4-0 No. 9054 "Cornubia." This locomotive, built in 1895, has now been withdrawn, leaving only three survivors of its class. Photograph by J. N. Westwood.

The New Ocean Terminal at Southampton

A handsome new edifice of unique character has been brought into use at Southampton Docks which, as the Prime Minister and other distinguished speakers said at the opening ceremony last July, is a "Monument to British craftsmanship, also a tribute to the Southern Railway Officers' enterprise and determination." It was in the days of the Southern Railway, which as successors to the London and South Western owned the vast network of docks and developed them to a high degree of extent and efficiency, that the plans for the new terminal were formulated.

This immense two-storey building covers practically the whole of the east side of the Ocean Dock, in the older part of the Docks Estate, where the largest liners, including the "*Queen Elizabeth*" and "*Queen Mary*" are berthed. It is finished in pre-cast concrete, with generous window space, having at its seaward end a semi-circular tower rising in four tiers to a height of 100 ft. which forms a notable land and sea mark.

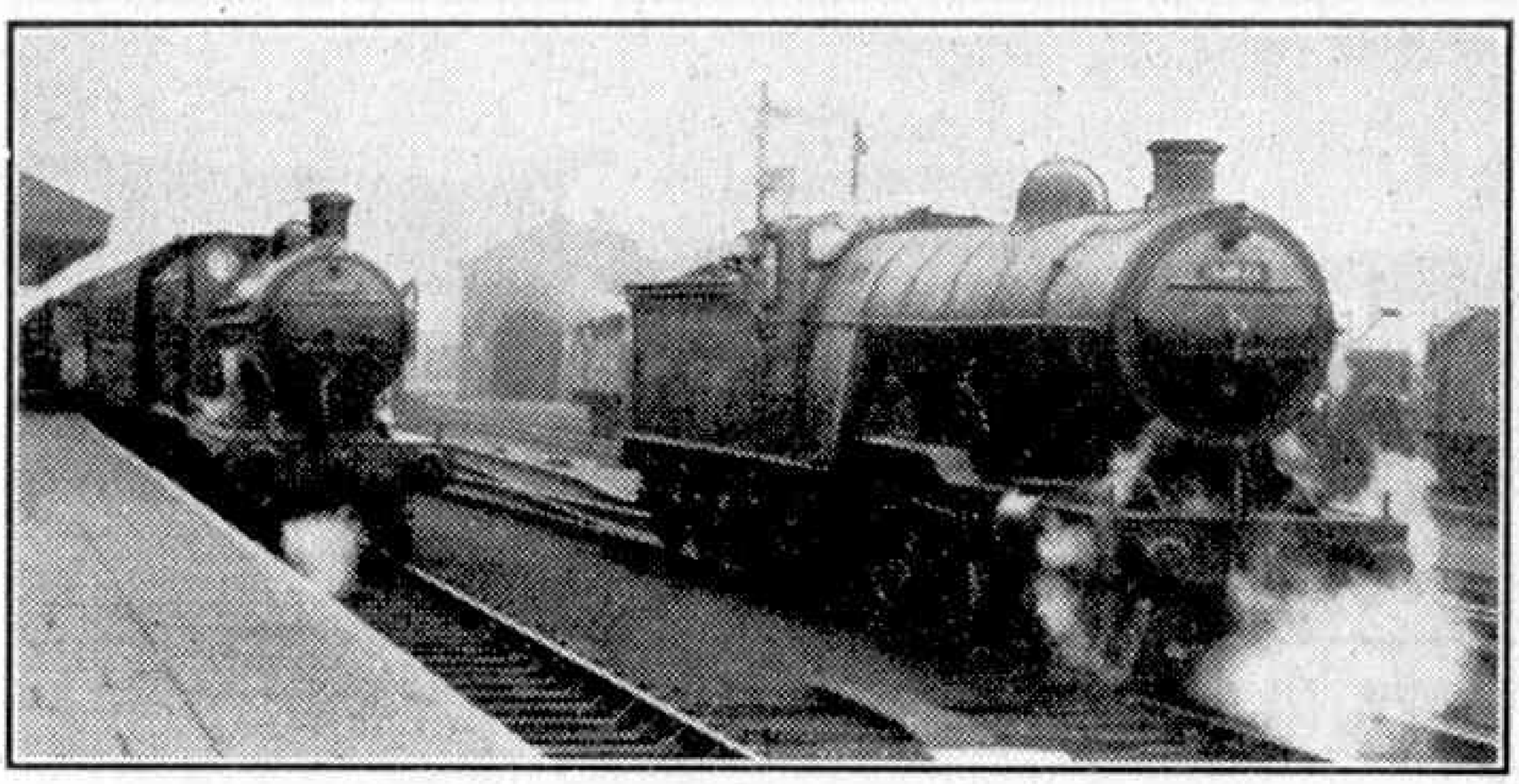
Southampton has justly been known for many years as "Britain's Premier Passenger Port." The addition of this superbly designed and appointed terminal building, replacing smaller and less comfortably equipped sheds, surely raises Southampton into the category of the finest passenger port of its kind in the world! Control is now in the hands of the Docks and Waterways Executive.

Carefree Travel When Seas Are Rough

While on the subject of the maritime side of railway activities, it is interesting to learn that stabilisers are to be fitted to one of the new Irish Mail vessels operating the Holyhead-Dun Laoghaire route during this winter. It is claimed that these will reduce the biggest roll of the vessel in rough seas to no more than 2 to 3 degrees. They will be similar to those fitted to the Dover-Calais new ship "*Invicta*," and if they prove wholly satisfactory in the strong currents of the Irish Sea, it is proposed to fit a second ship in the same way.

London Midland Region

Peterborborough (Midland) Motive Power Depot has been transferred to Eastern Region control and numbered 35C, instead of 16B. New locomotives recently placed in service include class "5" 4–6–0 mixed traffic, with roller bearings on all axles, Nos. 44683–5, allocated to 5A, Crewe North; class "2" 2–6–2T Nos. 41262–4, 28B, Fleetwood; Nos. 41265–6,



No. 62822, the last Ivatt Atlantic in service. Photograph by F. Ashley.

20E, Manningham; and diesel-electric 350 h.p. shunters No. 12069–70, stationed at 18A, Toton.

Among good runs recently reported along the main line to Euston has been a very fast trip with the "*Comet*" leaving Manchester at 5.50 p.m. headed by "converted Scot" No. 46167 "*The Hertfordshire Regiment*" with a 10-coach train weighing 345–350 tons full. A speed of over 80 m.p.h. was attained on the descent between Chelford and Crewe, prior to a permanent way slowing and then a signal stop. The 158 miles from the restart at Crewe station to Euston were covered in 169¼ min., including about 5 min. lost by out-of-course slacks, a considerable improvement on the 177 min. schedule. From Welton, after the slow passage of the Rugby area, to Willesden Junction, where a decided easing took place on the London outskirts, an average of 60 m.p.h. was maintained for 70 miles, including two slowings and a maximum exceeding 80 m.p.h.

"Jubilee" "5XP" 4–6–0 No. 45623 "*Palestine*," working a Liverpool-London relief express similarly loaded, ran up from Crewe in 179 min. compared with a rather liberal allowance of 186 min., in spite of suffering about 8 min. delays, so that there should be little difficulty in keeping the accelerated timings now in force or contemplated. More dark green "*6P*" 4–6–0s have been noted; some have been repainted thus though retaining original style boilers.

A Remarkable Running Achievement

Streamlined "A4" 4–6–2 No. 60031 "*Golden Plover*," of standard Gresley design stationed at Haymarket, Edinburgh, during July a,nd August last, appears to have run continuously for nearly six weeks, up one day and down the next, hauling the "*Capitals Limited*" between Edinburgh and King's Cross on its record regular non-stop run of 392½ miles each week-day, and the "Sunday Scotsman" calling at Newcastle on Sundays, without a break—a remarkable mechanical achievement! The engine was also on the same working again for shorter spells later in the season.

Western Tidings

New locomotives completed for service are 4–6–0 "Castle" class, with increased superheat etc., No. 7033 "*Hartlebury Castle*," No. 7034 "*Ince Castle*," No. 7035 "*Ogmore Castle*," No. 7036 "*Taunton Castle*," and 7037, not named at the time of writing.

Small 0–6–0Ts added to stock were Nos. 1625–8. Of the larger pannier class built by contract, Nos. 8420–1, 8462 and 9421–4 are also in service.

The very small 0–4–2T "Gazelle" recently taken into stock from the Shropshire and Montgomeryshire Railway has been withdrawn and presented on indefinite loan to the Royal Engineers' Transportation Museum at Longmoor, Hants. This tiny locomotive was originally a 2–2–2 well tank, weighing only 5¼ tons, being altered to the 0–4–2 wheel arrangement about 40 years ago. "Castle" and "Hall" 4–6–0s and 43xx Moguls were working through to Portsmouth or Bournemouth last summer on excursion or relief trains to the S.R.

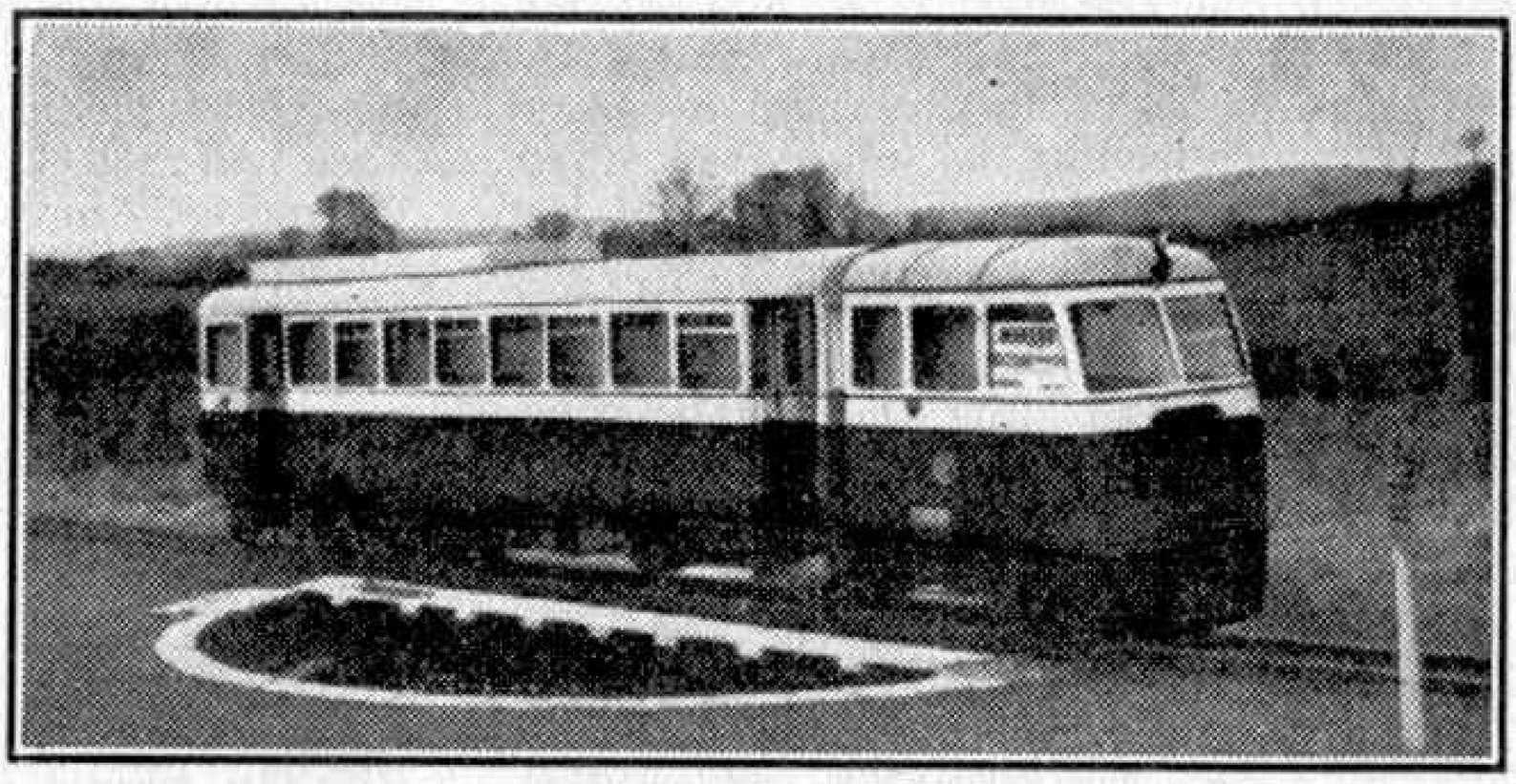
British Railways Steam Locomotive Stocks

The latest available returns, compiled up to the end of 1949, show that the total stock of steam locomotives had dropped to 19,782, a decrease of 423 compared with the previous year. There were 322 fewer tender engines and 101 fewer tanks. The reduction in 4–4–0 classes was 10 per cent., and that in the 0–8–0 range more than 20 per cent. Heavy scrapping has taken place of L.M.R. 0–8–0s. A number of diesel shunters have replaced steam tank locomotives. Among additions to stocks were 41 4–6–2s, 68 4–6–0s, 88 2–6–0s, 45 2–6–4Ts and 72 0–6–0Ts. These were divided among various Regions and in many cases had been ordered by the grouped companies before nationalisation. For instance, the 28 new "A1s" are allocated to former L.N.E.R. sheds which now form part of three different Regions.

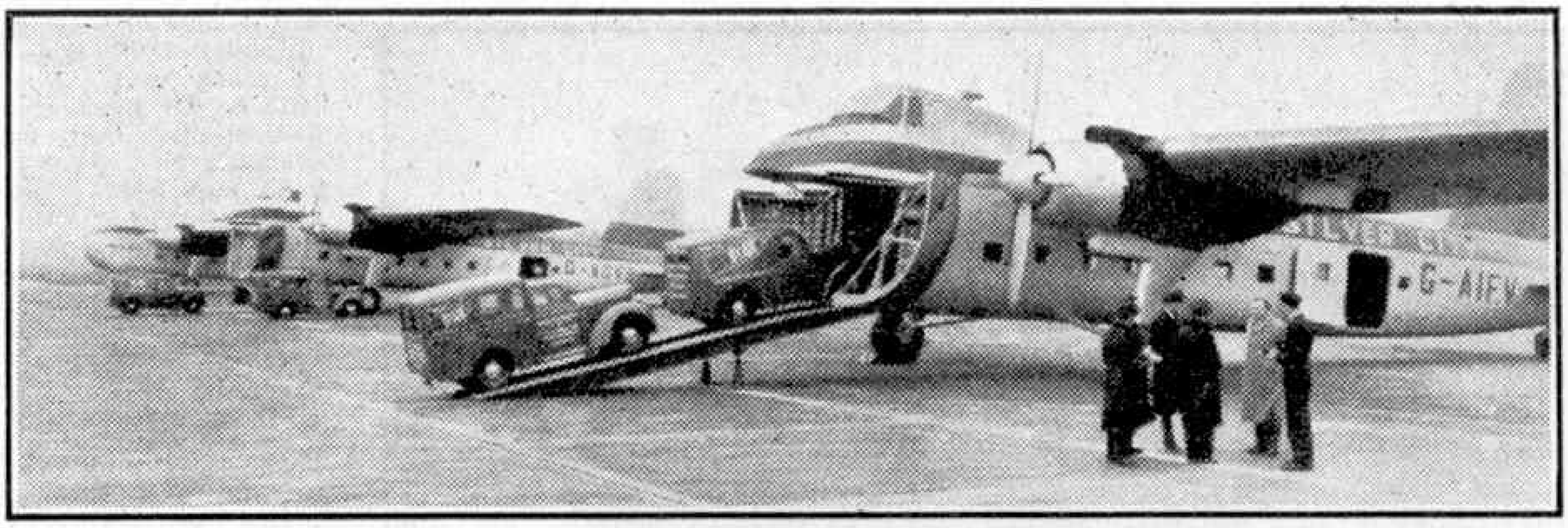
New Belfast-Cork "Enterprise" Service

The popular "*Enterprise*" non-stop service of the G.N.R.(I) from Dublin in the morning and Belfast in the evening is now provided by a diesel train. In conjunction with the C.I.E. the morning "*Enterprise*" service from Belfast has been extended to Cork. There is an afternoon return service from Cork. Engines are changed at Amiens Street, Dublin.

One quarter of the G.N.R. daily train mileage is now operated by diesel power.



County Donegal Railways railcar No. 19. This interesting vehicle is referred to in the article on The County Donegal Railways on page 484 of this issue. Photograph by C. L. Fry.



Loading into the Bristol "Freighters" the vans in which the Silver City Airways aircrews and engineers travelled to Filton to take delivery of the aircraft.

Flying on the Car Ferry

By John W. R. Taylor

"THERE I was, 1,000 ft. above the Channel with a couple of motor cars . . . . . "

If I had written that sentence in the "*Meccano Magazine*" ten years ago, most readers would probably have considered me a candidate for the nearest padded cell. Yet that is exactly where I was recently—"1,000 ft. above the Channel with a couple of motor cars," plus a large motor cycle, my wife and eleven other people. Needless to say we were all inside an aeroplane, enjoying our first experience of the cross-Channel car ferry service operated from Lympne Airport to Le Touquet in France by Silver City Airways Ltd.

Nor is the word "enjoying" an exaggeration, for, apart from the natural thrill that most of us get when flying on such a novel service, the Bristol "Freighter" in which we travelled was comfortable, not unduly noisy, and steady as a rock. As a result, we could not resist a certain self-satisfied feeling as we looked down through the large cabin windows and saw people crossing the Channel the "hard way" by steamer.

Of course, a lot of people will disagree, and say that they find the boat journey a delightful beginning to a Continental holiday. But, for the others who want to spend every possible minute over the other side, a service which can put them on the road to Paris within one hour of reaching their point of departure from this country has incomparable advantages. Thanks to Silver City, it is in fact quite possible to breakfast in London, lunch in Le Touquet and be in Paris with one's car in time for tea.

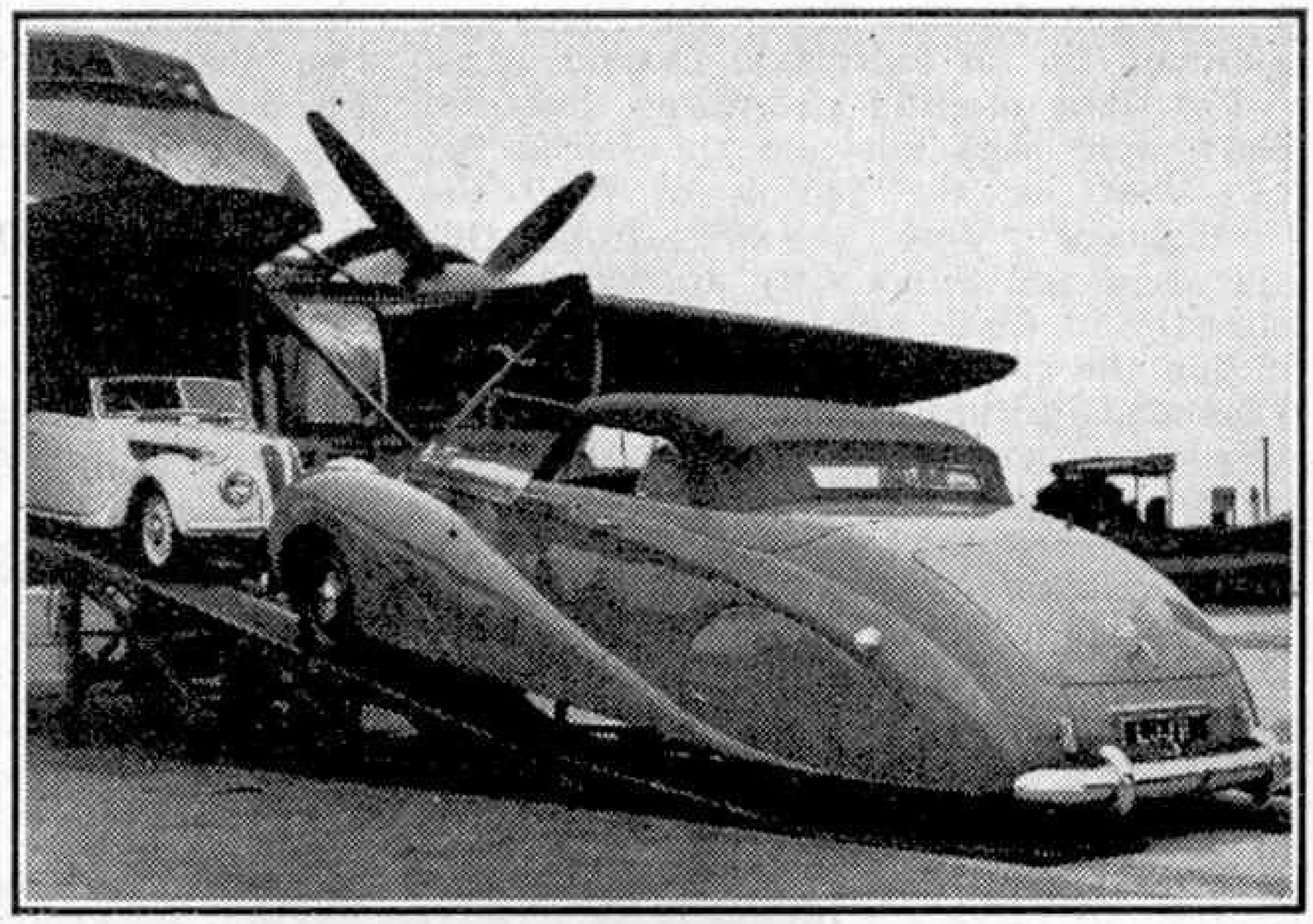
One of the company's three "Freighters" had just come back from Le Touquet when we reached Lympne, and was discharging through its huge nose loading doors a large Triumph saloon and an 8 h.p. Standard motor car. While we passed quickly through the usual Emigration and Customs formalities, the Austin A.70 and Citroen cars and motor cycle that were to form the main payload of "our aircraft" were first examined by Customs officers, then driven up a special motorised ramp into the "Freighter's" cavernous interior, where they were lashed down by the car marshaller.

We took our seats in the passenger cabin to the rear of the cargo hold, fastened our safety-belts, and were soon speeding over the grass airfield for take-off. By a strange coincidence, it transpired that one of our fellow passengers—the owner of the motor cycle—was a Bristol engineer who had helped to build the particular "Freighter" in which we were flying.

The journey across the Channel passed all too quickly, and within 20 minutes of taxying out for take-off in England we touched down in France, on the concrete airstrip at Le Touquet. The car marshaller began to unlock the nose doors of the "Freighter" even before we had rolled to a stop, and within a very few minutes the cars and their occupants were on their way, having passed with lightning speed through Immigration and Customs. We, on the other hand, were soon sitting down in the Airport restaurant, confronted

by the sort of steaks that we had dreamed about for years. But enough of French cooking. Suffice it to say we discovered that one can buy anything in France, without any rationing or queueing, *if* one has plenty of money!

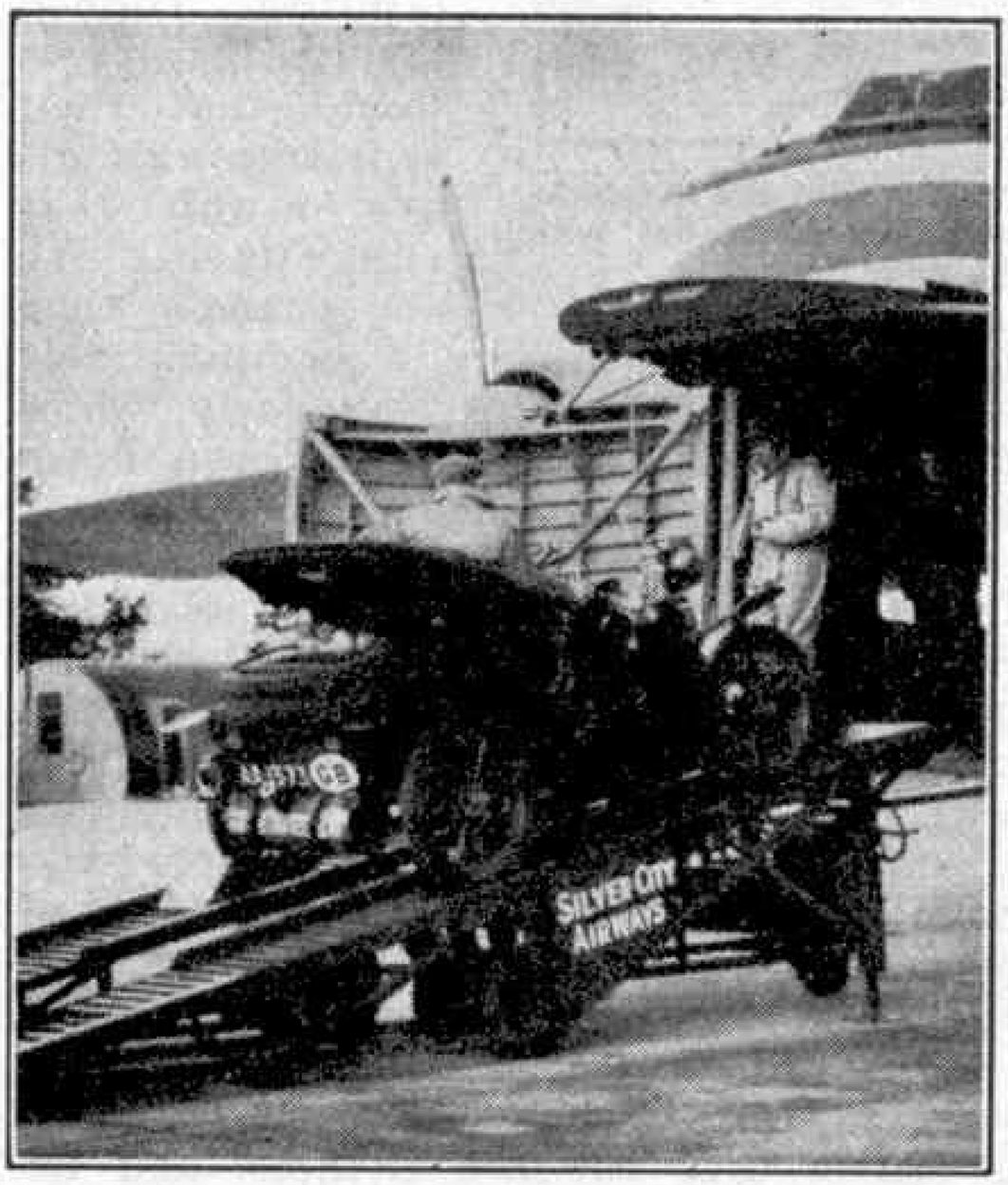
On our way home, after about seven hours of shop-gazing and relaxation on Le Touquet's wonderful beach, we flew near the famous Mulberry Harbour, which played such an important part in the liberation of France six years ago; and we could not help thinking how useful a fleet of "Freighters" would have been in those days, to carry in food, ammunition, guns, lorries and troop reinforcements to Field Marshal Montgomery's gallant armies.



A 20 ft. long Daimler, so far the largest car carried this year, with a little Fraser Nash which was transported at the same time.

The "Freighter" was, in fact, conceived originally as a military transport capable of carrying some five tons of equipment, including light tanks, jeeps and field guns. Two Bristol "Hercules" engines were chosen to power it, and they develop so much power that it can take off fully-loaded in only 750 yds., and fly quite happily on a single engine if necessary. The design was deliberately kept as simple as possible, without such "frills" as a retractable undercarriage, to reduce maintenance requirements to a minimum.

Its high power makes the "Freighter" an extremely safe aeroplane. On the car ferry, for example, it rarely flies with a payload of more than 9,000 lb., yet it can maintain height on one engine with a 14,000 lb. payload. So there is obviously plenty of power in hand—a reassuring fact for passengers. Its general sturdiness of construction and reliability also suit it well for the gruelling task of repeated landings and take-offs for hours on end at each terminus of the short 47-mile route from Britain to France.



A 1904 Darracq, the oldest car Silver City Airways have ferried across the Channel. Note the special motorised ramp, designed and built by the company.

Only an aircraft like the "Freighter" could have made the car ferry possible, and the story of the service itself provides yet another example of how Britain's "private enterprise" charter companies have been able to survive and even make a profit in an age when heavily-subsidised, state-owned airlines are losing fortunes. Nobody had ever before tried to organise such a service when, on 13th July 1948, Silver City Airways flew their first motor car across the Channel, consequently nobody could predict whether motorists would be prepared to pay somewhat higher ferrying costs to avoid the inevitable delay and occasional discomforts of the boat ferry. It was soon obvious that they were prepared to do so, and Silver City carried

180 cars across the Channel in that first Summer, on an individual charter basis.

For some months afterwards the company were kept busy on the Berlin Air Lift, but by the Spring of 1949 the "Freighters" were released from this operation, and Silver City applied to the Ministry of Civil Aviation for permission to run the car ferry service as a regular, scheduled service under an associate agreement with British European Airways. Permission was granted and the first scheduled flight took off for Le Touquet on 13th April. To strengthen the service, the company worked in conjunction with Société Commerciale Aerienne du Littoral, whose initial letters S.C.A.L. are the same as those of Silver City Airways Ltd., and who operated their own "Freighters" from Le Touquet.

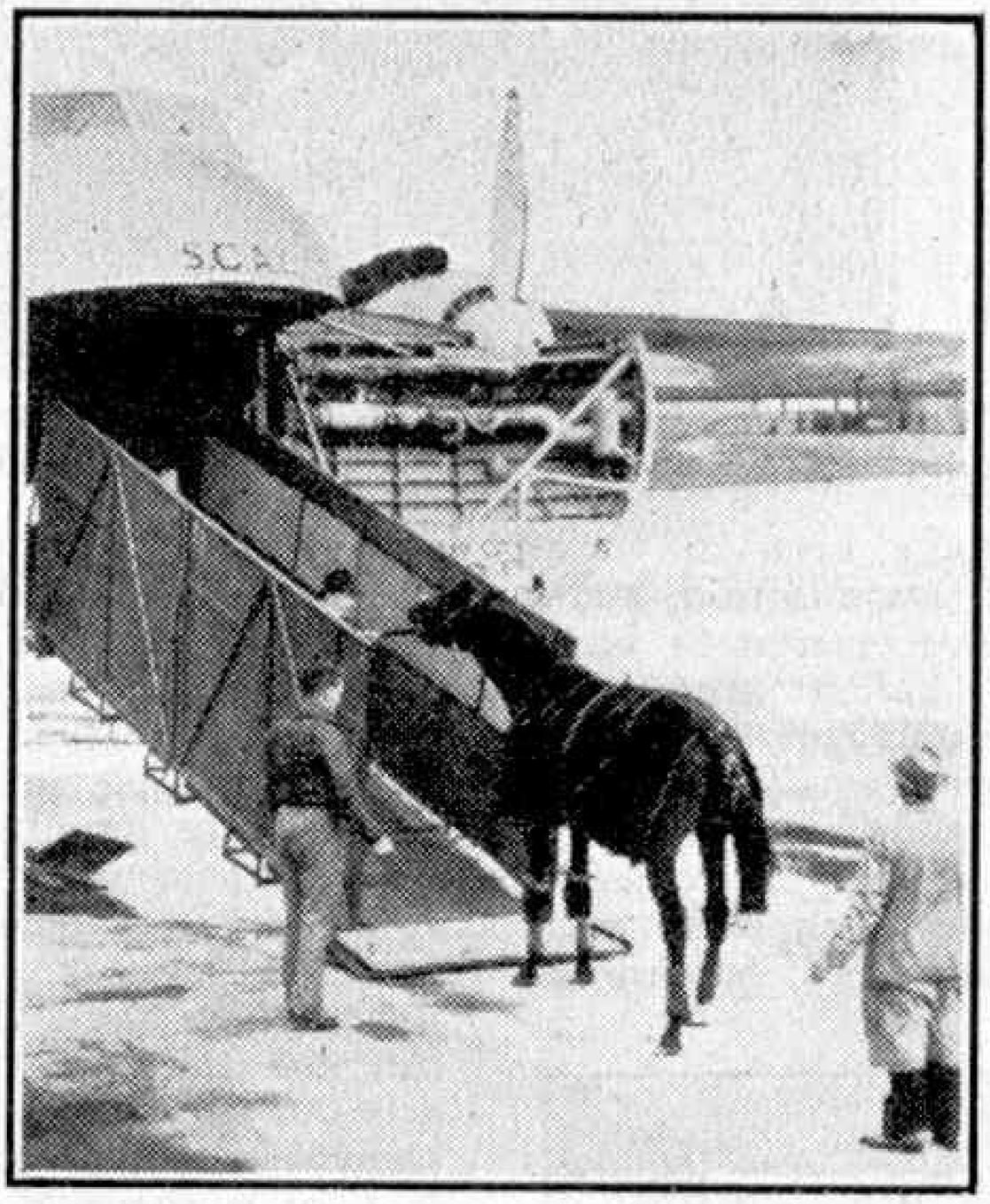
Bookings began to flow in and by mid-June the 800th car had been booked. Six weeks later the 1,000th car was carried and as many as 16 services a day were being operated. On 28th July, a total of 23 round trips was completed by the companies' four "Freighters," a record that has been exceeded several times this year.

All sorts and sizes of cars have been carried, from a 1904 Darracq to giant super-streamlined 1950 Daimlers, Rolls-Royces and the famous Alfa-Romeo racing team. Summer rates are £32 single for large cars and £27 for small ones, with a reduction to £25 and £19 respectively during the Winter season. This is an "all-in" rate, including fares for up to four passengers; additional passengers can be carried for two guineas each, with reduced fares for children. Cyclists can also use the ferry, at a cost of £1 for their bicycle and £2 for their seat in the aircraft.

As would be expected, business is very seasonal, with the main flow of traffic on the outward journey from Lympne to Le Touquet in early Summer and in the reverse direction in September and October.

This has enabled Silver City to offer attractively low cargo rates for the journeys on which their "Freighters" would otherwise fly empty, and has resulted in the carriage of a wide variety of freight. Over 60 tons of fruit were flown to England in one series of 19 return flights in July 1949. A less perishable cargo was a ton of refractory blocks, which are used to line furnaces, and which formed one of the most concentrated loads ever carried by air as they occupied a space no more than five feet by two feet.

A great deal of livestock has also been carried, including French racehorses, which have sometimes run within a few hours of landing. Indeed trainers have found that their sensitive animals are much less susceptible to air sickness than to sea sickness during a comparatively longer journey by boat. Similarly, whole herds of pedigree cows have been flown to the Continent.



Silver City also carry a great deal of freight and livestock, especially racehorses. The holds are fitted out with several separate stalls on such occasions.

Unusual cargoes have included the furniture for the Maharajah of Baroda's flat, flown from Blackbushe to Paris, and a car belonging to the famous Polish pianist Stanislaus Niedzelfski, together with a trailer containing his grand piano.

Among the many famous people who have used the car ferry are the King of Siam, Sir Frederick Handley Page, Sir Richard Fairey and a host of film stars.

So far this year, well over 3,000 cars and some 14,000 passengers have been carried by Silver City between Lympne and Le Touquet, despite currency restrictions, the international situation and all the other unpleasant features of our life to-day.

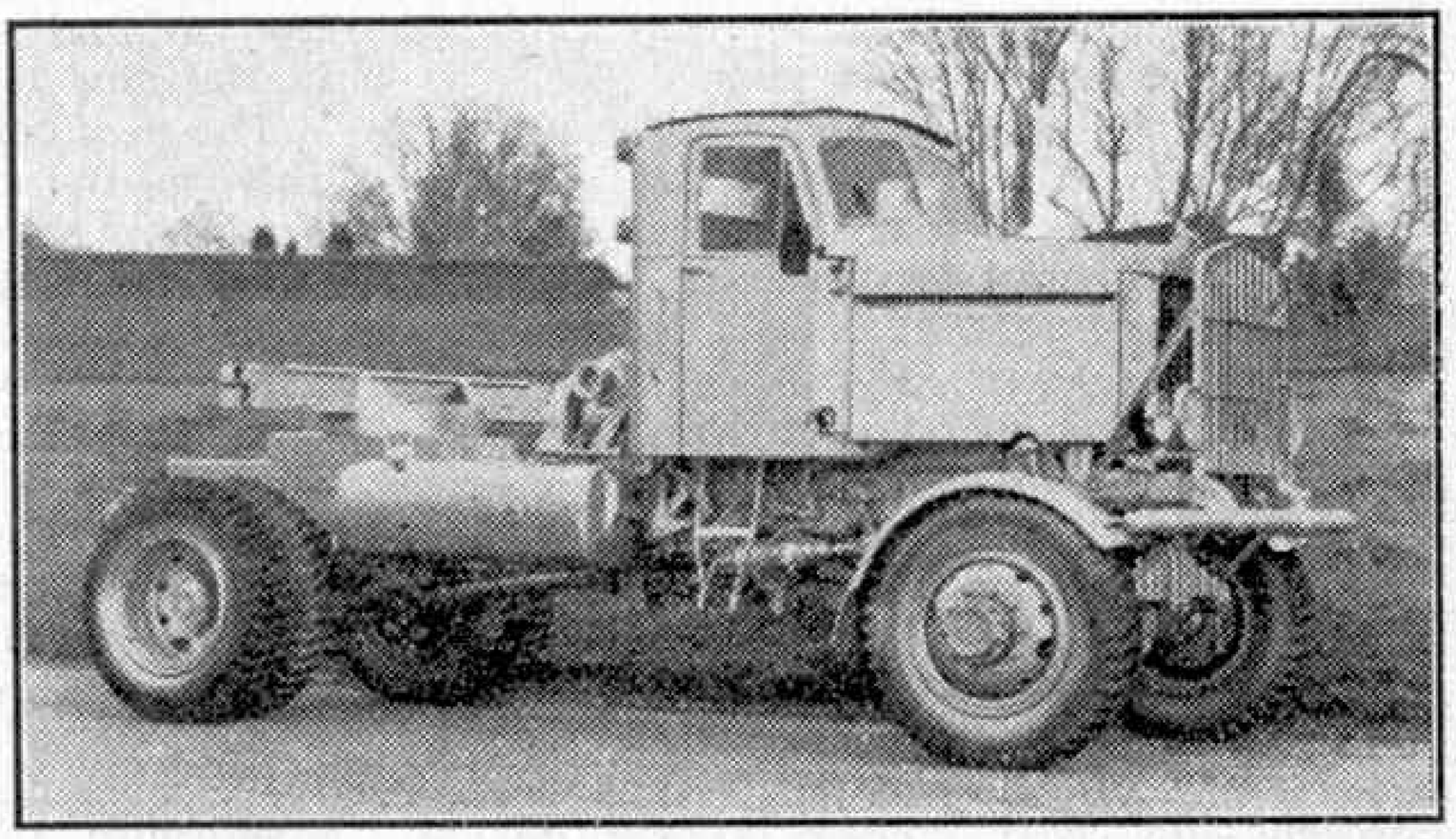
A Scammell "Four by Four"

SCAMMELL Lorries Ltd. have long been famous for the size and robustness of their road vehicles of all kinds, and the giant Scammell tractor illustrated on this page fully meets our expectations in regard to the firm's products. Its size may be realised from the fact that the top of the cab stands almost 10 ft. above ground. The wheel base is 14 ft. and the overall length is 18 ft. 9 in. This gigantic vehicle alone weighs over six tons, and the gross weight with the full load it is designed to carry is nearly 20 tons.

The tractor is what is known as a "four by four," which means that it is a four wheeler with drive to all four wheels. Many of the vehicles have been supplied to the Shell Petroleum Co. Ltd. for use in Borneo, where they are to be employed on development work in rough conditions. One has been equipped with a winch and timber trailer for use on forestry work in East Africa.

The illustration at the head of this page, showing the tractor with a load of giant logs on a trailer, helps to give some idea of the enormous power of the vehicle. The engine is a diesel-direct injection of 10.35 litres capacity manufactured by Henry Meadows Ltd., Wolverhampton. This has six cylinders in line, and at its governed speed of 1,900 r.p.m. develops 130 b.h.p. The tractive effort of the vehicle on the lowest gear is 17,740 lb., while its speed in top gear at the highest number of engine revolutions a minute is 30.5 m.p.h. Steering as well as braking is aided by compressed air.

The tractor has given remarkable results under test on soft ground and in boggy conditions, its immense power allowing it to be extricated without difficulty even when it has stood long enough for the wheels to sink well into the ground. On the Scammell test ground near Watford it ploughed its way rapidly and easily through waterlogged sections in which the water reached its axles, and in dry conditions it can readily climb gradients steeper than one in three.



The pictures on this page show the four-wheel drive tractor that is now part of the range of heavy goods vehicles made by Scammell Lorries Ltd., Watford, by courtesy of whom they are reproduced. In our upper illustration the unit is hauling a heavy load on a trailer.

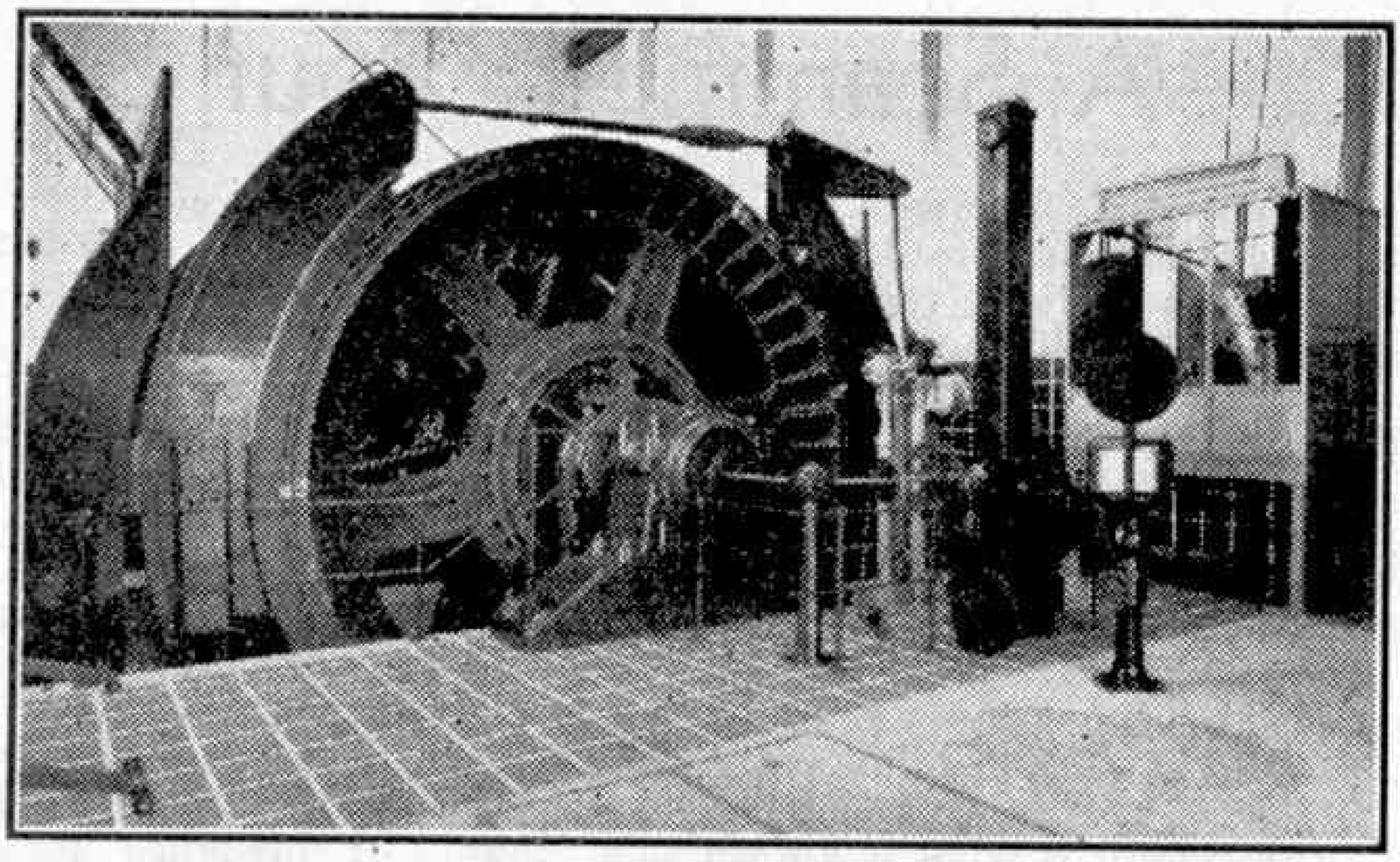
Opening a New Coalfield

GREAT BRITAIN is an island of coal. For more than a century our coalfields have been worked on an intensive scale, but even to-day the full extent of the coal resources of the country is not fully realised. Recent borings have proved the existence of an enormous field in the Midlands, and extensions eastward have been made in the mining areas of South Yorkshire and Nottingham.

An interesting example of extension of this kind is the opening of a large mineral area at Calverton, in the Nottingham coalfields. Before the mines were nationalised, three collieries, at Calverton, Cinderhill and Babbington, formed part of the workings of a company that decided on development to the eastward of the existing coalfield. The sinking of a new shaft at Calverton began in 1937. An engine house was built, and a winding engine installed in it was used during the sinking operations, which were finished early in 1939. Connections were made in the top hard coal seam reached with the workings of an adjacent colliery, and the new shaft began to be used for man riding and for coal haulage towards the end of that year.

Progress ceased during the war, and when at the end of the conflict the original proposals were reviewed it was decided that a second and larger shaft should be sunk for winding coal in self-loading and discharging skips. Provision also was made for preparing and handling the coal by modern methods and the first sod of this second shaft was cut a few months after the war ended. When nationalisation came the plans already set in motion were confirmed by the National Coal Board. Work then began on the engine house, and preparation was made for sinking the shaft, known as the No. 2 Calverton shaft, by the freezing process, in which the ground in which the boring is made is frozen solid to facilitate operations.

The new colliery is in agricultural country near the old world village of Calverton, famous for the introduction of hand looms for the silk industry about 300 years ago. Special efforts were made to prevent the surface workings from becoming eyesores. The original design for the general scheme included 500 cottages for the miners, with playing fields and recreation grounds. Only 22 houses had been completed when the war broke out, and for various reasons the village settlement may be moved further from the colliery than was originally planned; but in other respects the good features of the original scheme are being preserved in the new layout.

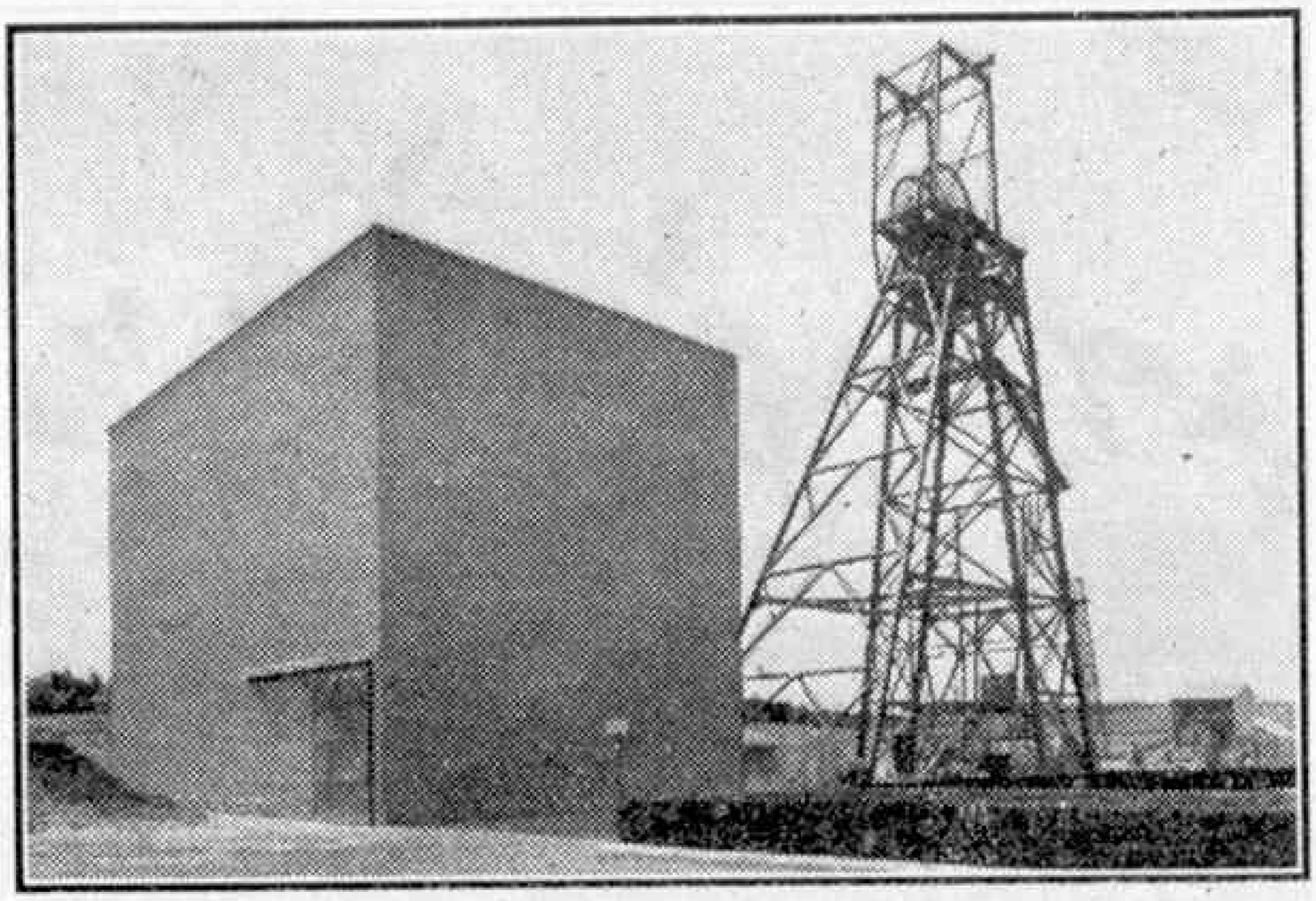


The No. 2 winder at the Calverton colliery, in the Nottingham coal field. The two winding drums are 17 ft. 6 in. in diameter and 7 ft. wide. The illustrations to this article are reproduced by courtesy of the General Electric Co. Ltd.

The new colliery will contribute remarkably to the coal output of the country. Five main seams will be worked, at depths between 1,158 ft. and 1,680 ft. Three of these seams are over 3 ft. in thickness, and the others are 2 ft. 4 in. and 2 ft. 5 in. deep respectively. Further seams to a depth of 2,400 ft. have been proved to exist, but the quantity of coal in the five seams to be worked will provide sufficient reserves to give the colliery a life of 100 years. It has been designed to yield a million tons of coal a year, with two-shift working, and it is expected that eventually 1,770 men will be employed underground and 340 on the surface.

When the colliery is in full working order the bulk of the coal will be wound

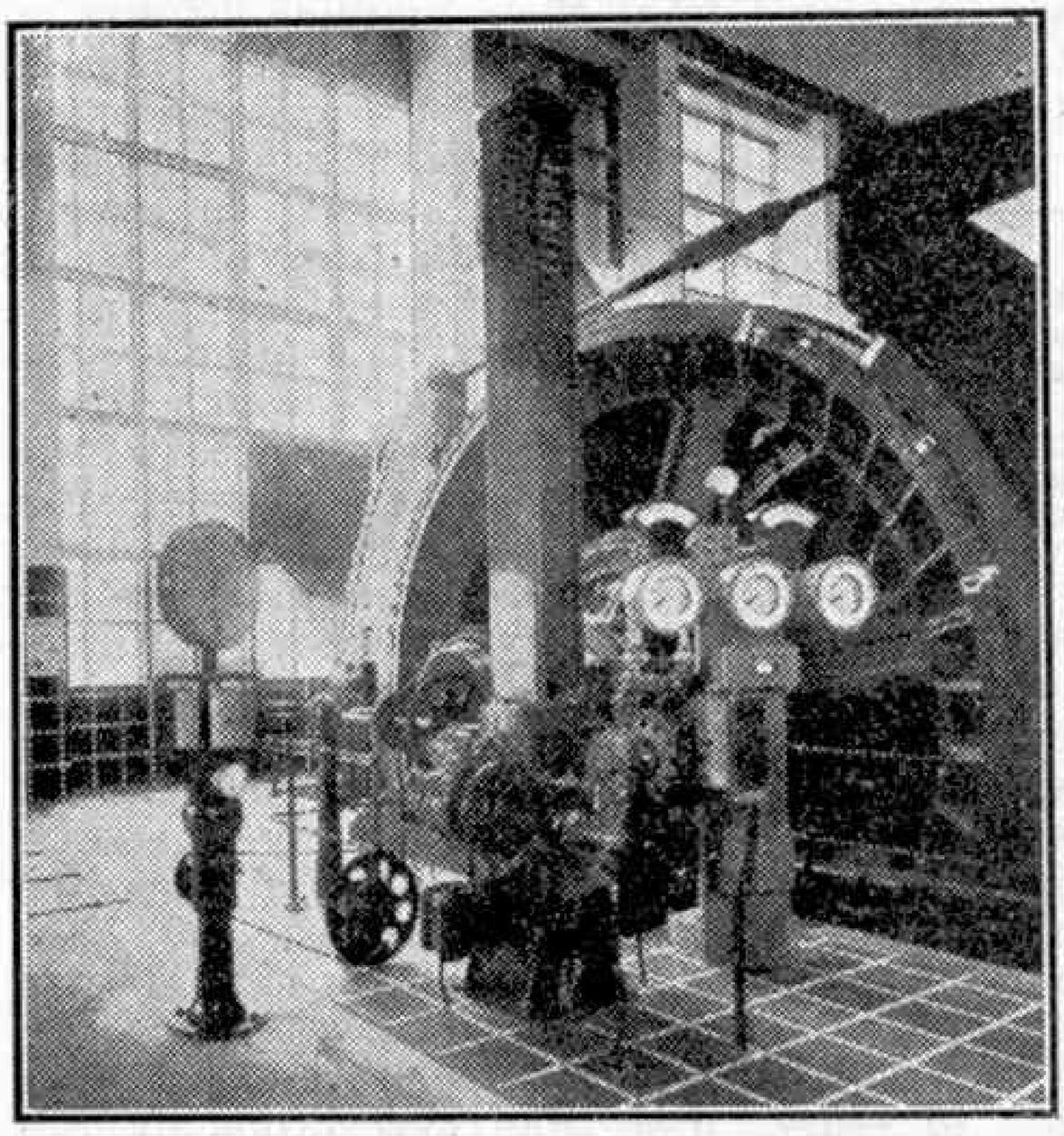
at the No. 2 shaft, in large capacity skips holding 10½ tons of coal each. The skip discharge platform is 20 ft. above ground level, and the head gear, rising 148 ft. above the ground, will be the highest in England. Coal will be raised at the rate of 400 tons an hour. The actual winding time will be 80 seconds, with an additional 10 seconds for loading and emptying the skips. The winder drums are 17 ft. 6 in. in diameter and 7 ft. wide. They make 28.7 revolutions a minute, and the actual rope speed is 1,580 ft. a minute. Coal winding will normally be carried out with the skips in balance, but as the winder was used during the shaft sinking, provision was made for the equipment to wind an unbalanced hopper of 10 tons capacity in addition to carrying out the normal duties of a sinking hoist.



The pithead gear and winder house at Calverton. The pithead gear, with an overall height of 148 ft., is the tallest in England.

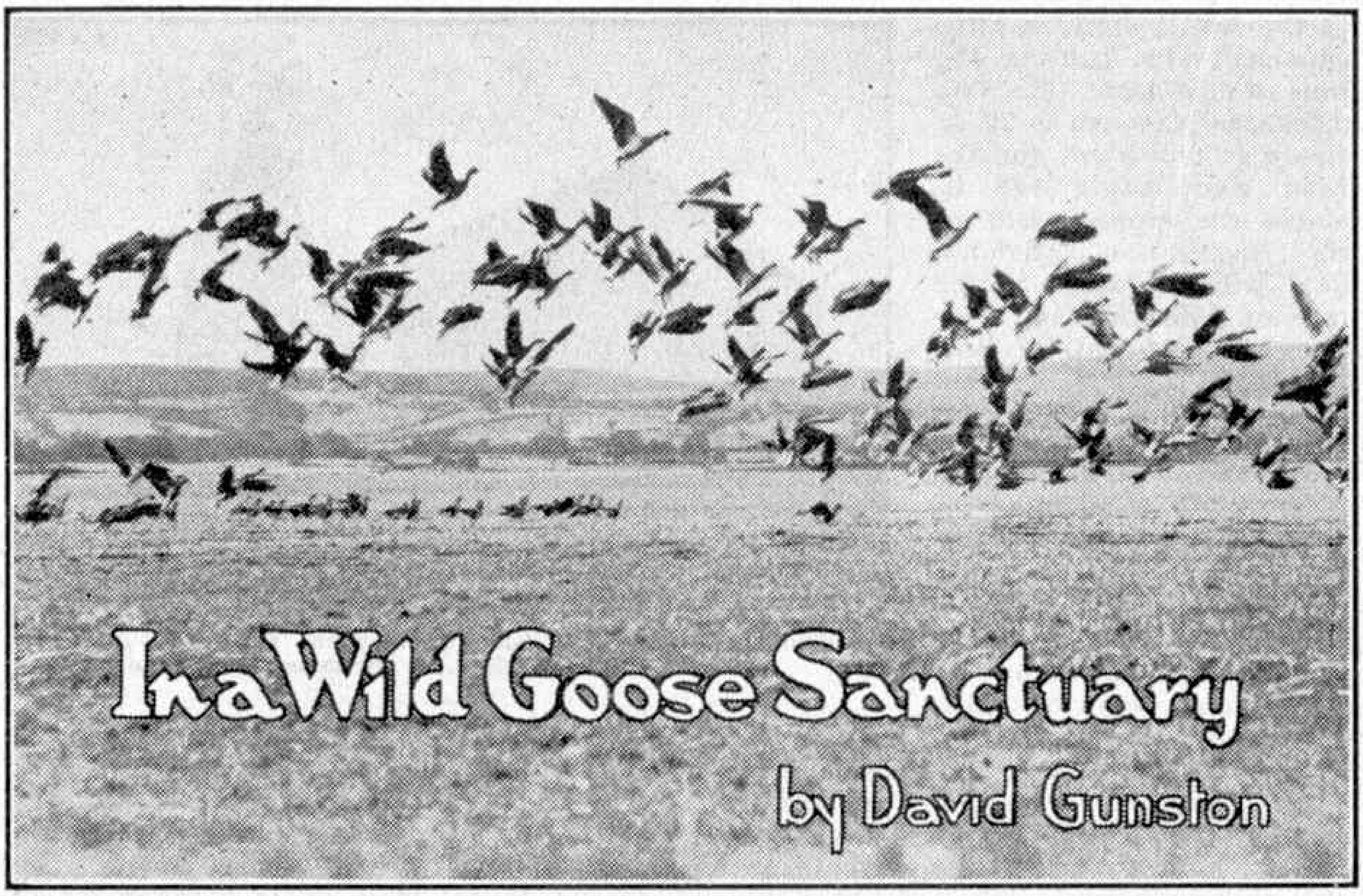
The main driving motor of the winding unit is rated at 1,750 h.p. and its peak horse power is twice the full load. The two drums have cast iron cheeks and mild steel shells that have grooves in them for the ropes. One is secured to the shaft, which is of forged steel and has a diameter of 1 ft. 9 in., and the other is mounted in gun metal bushes and driven through a muliple tooth clutch arranged to give about 4¾ in. of rope travel per tooth, which allows close rope adjustment. The double helical main gears through which the drive is transmitted are of the single reduction type.

Special consideration was given to the design of the brake gear in view of the arduous duty to be carried out during sinking operations. It has a special linkage to ensure true parallel motion. Each brake is operated by an oil engine, and oil pressure is supplied by a weight-loaded accumulator served by direct coupled pumps.



Another view of the No. 2 Calverton winder, showing the instruments and the depth indicator.

The control gear is mounted in the basement of the engine house, below the winder itself. It consists of a reversing contactor and a liquid controller. The contactor is capable of carrying out up to 150 operations an hour in both forward and reverse directions, and is fitted with mechanical and electrical interlocks. The liquid controller is a device in which the current supplied to the winding motor is varied by passing it through a conducting liquid, or electrolyte, between two electrodes, one of which can be moved towards or away from the other. In the controller installed at Calverton there are three electrode chambers, and the moving electrodes act like weirs to retain or release the electrolyte. This is fed into the electrode chambers as required from a header into which it is pumped from a lower compartment into which it runs when released.



In a Wild Goose Sanctuary

by David Gunston

HIDDEN away in a far corner of the Gloucestershire countryside, on the banks of the wide estuary of the River Severn, lies what is in many ways the most interesting bird sanctuary in the world. It is the headquarters and observatory of the nature organisation known as the Severn Wildfowl Trust. This was formed in 1946 by a group of bird enthusiasts, notably Peter Scott, son of the famous Antarctic explorer Captain Robert Falcon Scott. He is well known for his paintings of wild geese and his B.B.C. broadcasts and lectures to schools.

Wildfowl, the name by which all varieties of wild geese, ducks and swans are known, have been Mr. Scott's chief interest for many years, and with the keen assistance of other people similarly interested he has built up this fine sanctuary for the watching and study of these thrilling birds. This is no zoo-like enclosure, with cages and fences, nor is it a dense wood or stretch of wild country left untouched for the benefit of the birds. Rather is it a centuries-old haunt of wild geese and other birds, transformed by skilful means into a watching-place that is unique, and into a permanent home for large numbers of similar birds that live under natural conditions in semi-captivity.

Come on an imaginary visit to the sanctuary, and see why it is so remarkable. Wild geese of many kinds visit this country in winter from their breeding haunts in Greenland, Iceland, Spitzbergen, Siberia and the far north of Norway, spending several months on shores and rivers in many remote parts of Britain. But they are terribly wary, and usually you can only watch them from a distance. Of the countless pairs of wild wings that drop down on this island from the icy north every autumn, a large number settle on the broad marshy plains adjoining the River Severn south of the city of Gloucester. They deliberately choose a lonely stretch of estuary, far from the bustle of traffic and towns, and have been coming each year to a long strip of grassy salt marsh known, a little oddly, as the New Grounds, for several hundreds of years. Free from molestation on this unfrequented part of the ancient Berkeley estate, with its historic castle, hordes of

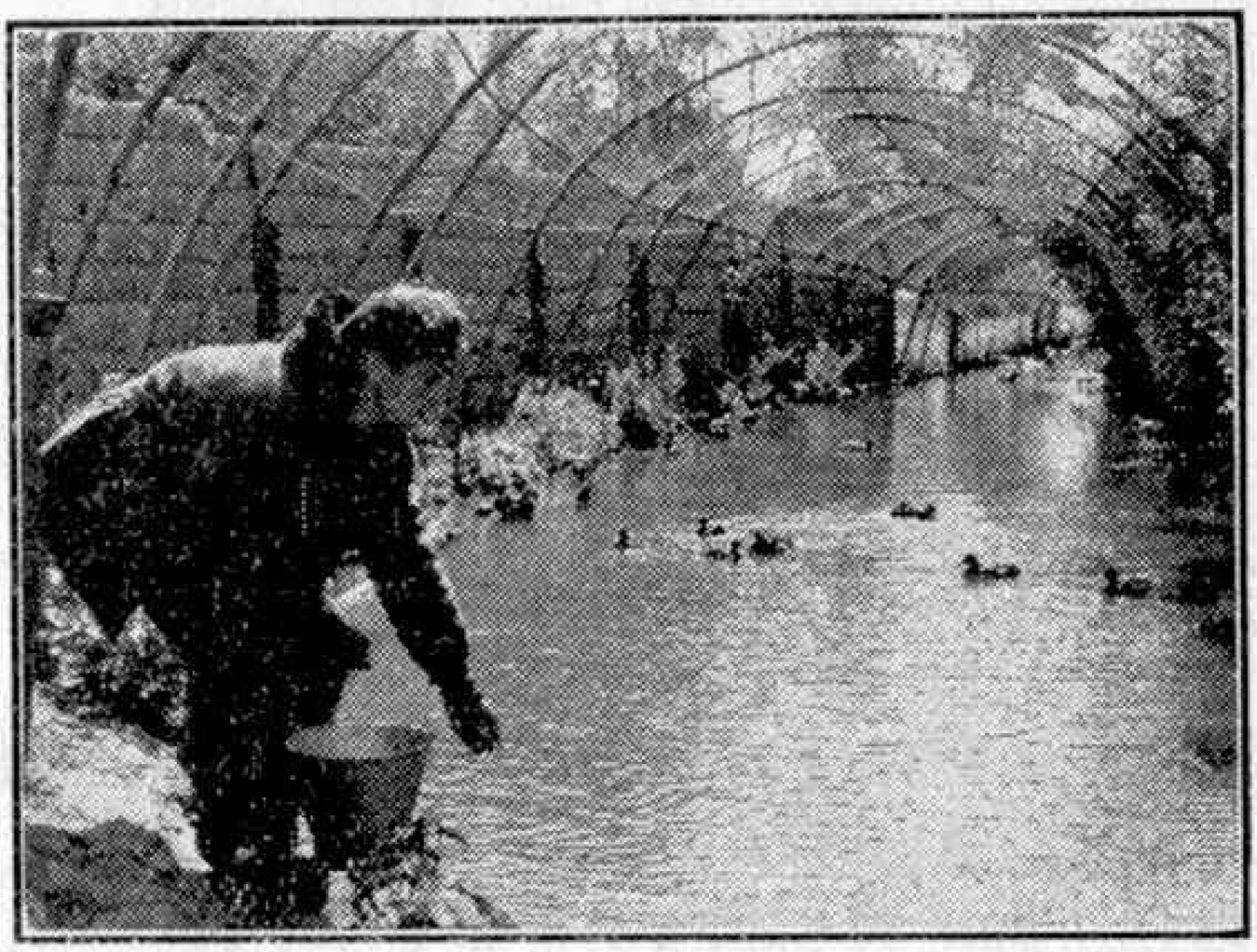
The remarkable picture at the head of this page, showing a flock of wild geese rising, was taken from one of the observation huts of the Severn Wildfowl Trust. This Trust has its headquarters on the Severn marshes near Slimbridge, Gloucestershire, and is directed by Peter Scott.

squabbling geese have been content to feed on the saltings year after year, virtually unnoticed by naturalists.

Now all that is changed. The geese still come, but they are watched and studied as never before, and all because of a strange stroke of fortune.

Turn off the main Bristol to Gloucester road at a tiny sign-post marked Slimbridge, pass that little village, and go over the straight Gloucester and Berkeley Canal down a narrowing lane, until you reach a neat group of farm buildings and cottages. These are now the offices and headquarters of the Trust.

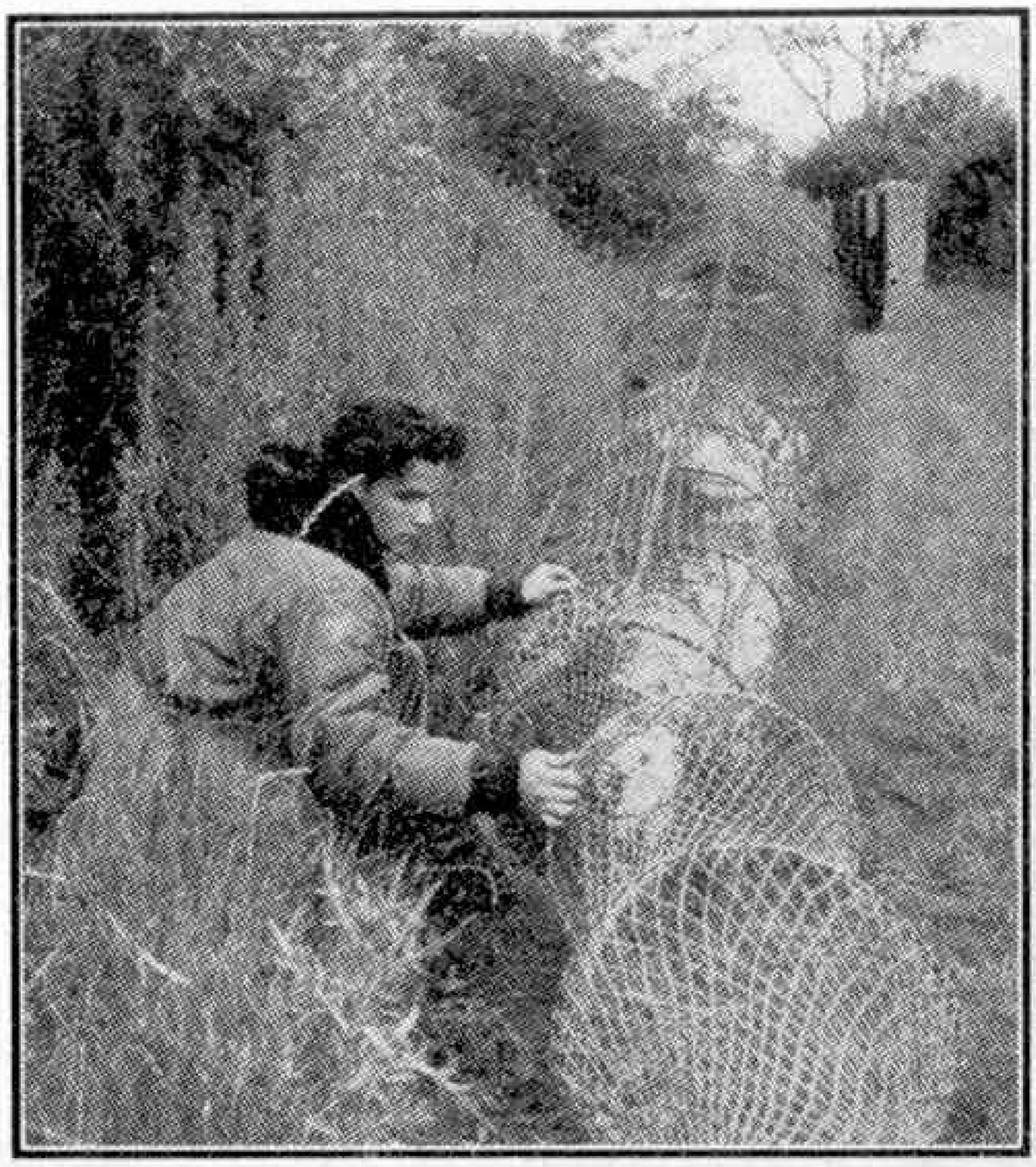
Passing through the entrance way, which is under the supervision of one of the several guides and wardens who run the place, walk further down muddy tracks towards the estuary. Soon the rough ploughed lands stop abruptly at an old sea wall. This was built many, many years ago of earth and stones covered with turf to keep the pasture lands behind it from being flooded when the Severn swells with the spring tides. During the invasion scare in 1940 the War Office built a number of substantial concrete pill-boxes along its top as part of the local defences. These looked out across the marsh land, over the wide river and beyond to the blue hills of the Forest of Dean. After the war they were left deserted, until one day some local naturalists discovered that from them one could watch the geese on the level marsh without the birds sensing danger. Normally a great flock of wild geese would take off in hectic alarm at the sight of anyone closer than about 400 yards. But having grown accustomed to the grey shapes of the pill-boxes, with their narrow observation slits, the birds knew no different when the concrete structures contained excited groups of bird-watchers.



Feeding time for the young full-winged mallard ducks in one of the "pipes" of the Trust's duck decoy. These birds will fly out to the river later, bringing the wild ducks back with them.

That piece of luck decided Mr. Scott and his friends on the New Grounds at once. The Trust was formed, mainly of interested people all over the country, who pay a small subscription, and it secured watching and preservation rights over the entire marshes, together with use of the surrounding waste land and the existing buildings. They could not have made a better choice, for apart from the large numbers of wild geese that spend each winter on the river—and these include the very rare lesser white-fronted geese, only seen twice in Britain before—the area is favoured by ducks and many other kinds of birds. It is far enough from built-up areas to make an ideal wildfowl sanctuary, and it even contained a disused duck decoy, a wire, tunnel-shaped trap in

Many of the birds in the grounds of the Severn Wildfowl Trust are remarkably tame. Here some are seen feeding from the hand of the Director.



Setting the tunnel net in position on one of the "pipes" of the Severn Wildfowl Trust's duck decoy. Ducks caught here are ringed before release as an aid in the study of migration.

which wild duck can be caught quite easily.

Now everything is in ship-shape order, and visitors are welcomed. The concrete pill-boxes have been augmented by a long line of wattle huts specially designed for goose watching; the old duck decoy has been repaired and is in full working order, one of the very few still operating in England; an expert staff has been installed; and the world's largest collection of semi-tame waterfowl has been assembled in special pens and enclosures, while educational and experimental work of many different kinds goes on apace.

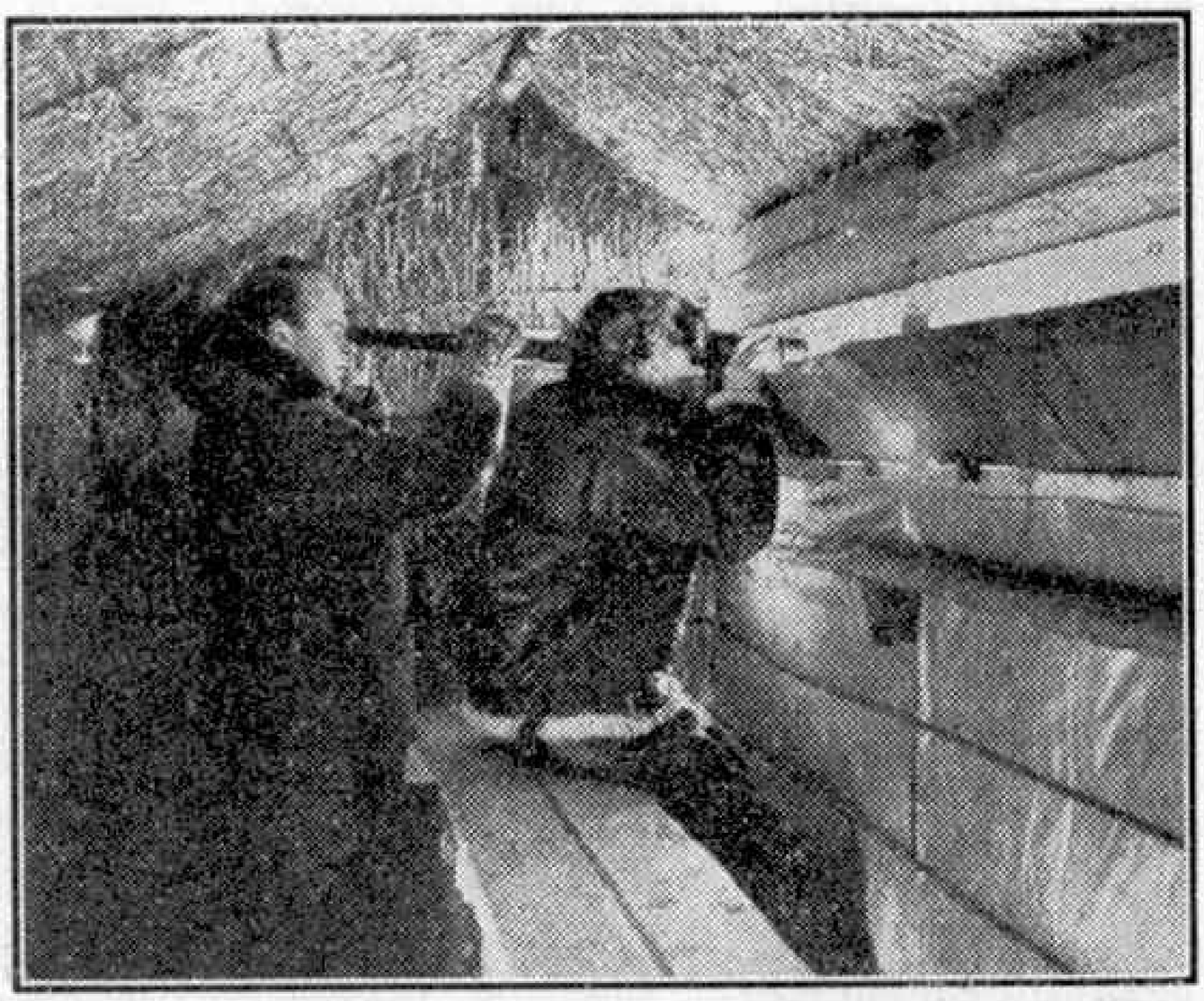
Wildfowl have been causing science a good few headaches of recent years, for they have been dwindling in numbers inexplicably almost everywhere. By its work, the Severn Wildfowl Trust hopes to discover some of the answers to that particular mystery, as well as offering many people a chance of seeing at close quarters birds they might not normally be able to watch successfully.

The New Grounds observatory, now so efficiently laid out and organised, has three distinct things to show the visitor. These are the wild geese on the saltings, the tame waterfowl collection, drawn from all over the world, and the working duck decoy. Let us look at each in turn.

The wild geese arrive in late September and leave again the following March, so it is no use expecting to see them in the summer. Christmas time sees the most on the flats, when up to 4,000 or more birds may be watched at one time. From the huts and pill-boxes you can see these great creatures feeding, preening and squabbling amongst themselves from really close quarters, often at a range of five yards, sometimes even closer. Binoculars and telescopes are mounted in the huts for easy watching, and photography is not difficult.

Whitefronts are the commonest species, but pinkfeet, greylags, and bean and barnacle geese may be seen, as well as all kinds of wild duck, ravens, waders, birds of prey, plover, gulls and many other birds which are usually present in winter to add to the watcher's enjoyment. Care has to be taken to keep heads down and voices silent when approaching along the back of the sea wall, but the wardens can handle quite large crowds of eager visitors without scaring away the geese, universally known as the wariest of all birds.

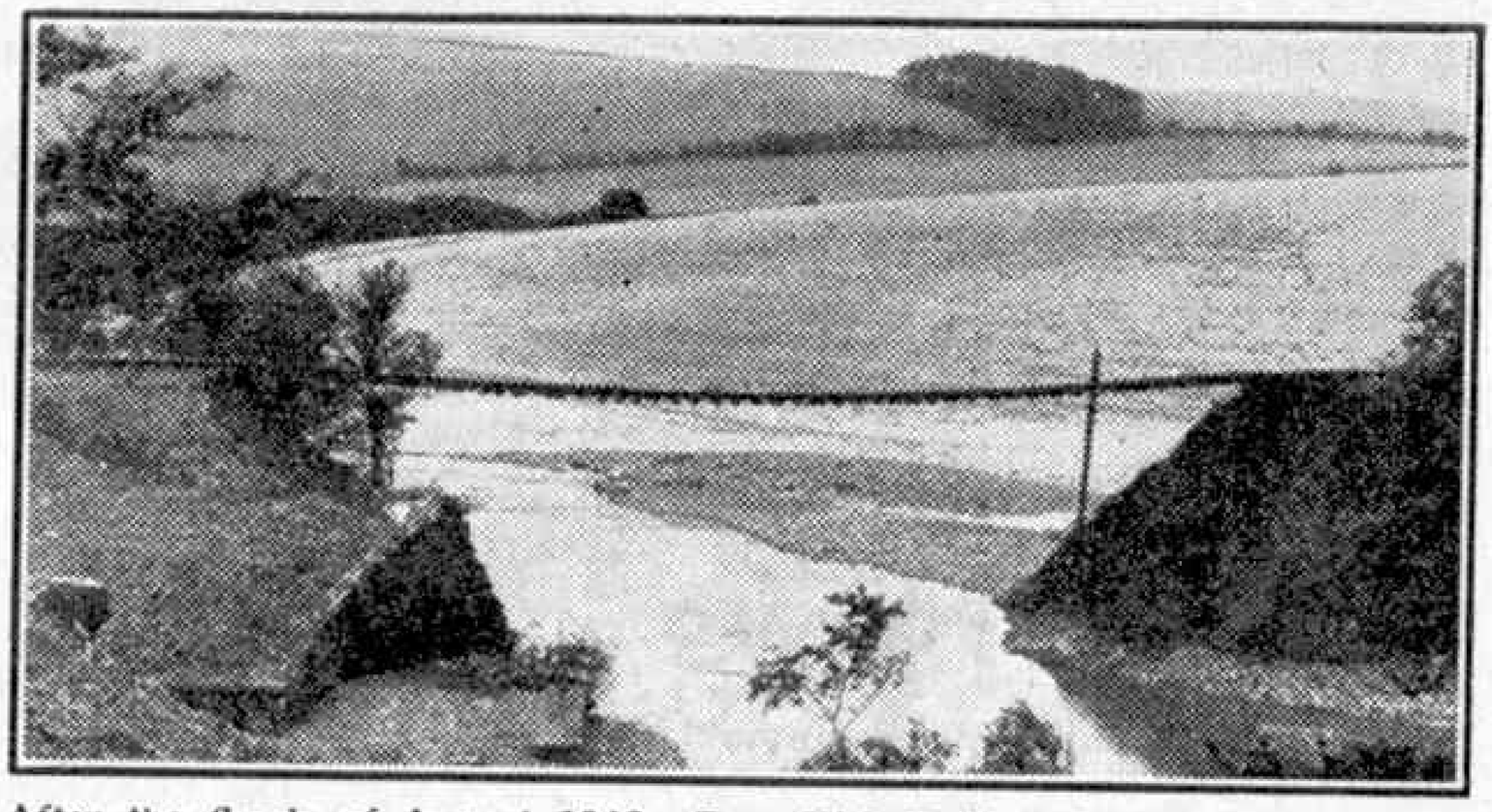
But the wardens are not content just to watch, sketch and photograph these geese at the sanctuary. Numbers are carefully counted, (*Continued on page 524*)



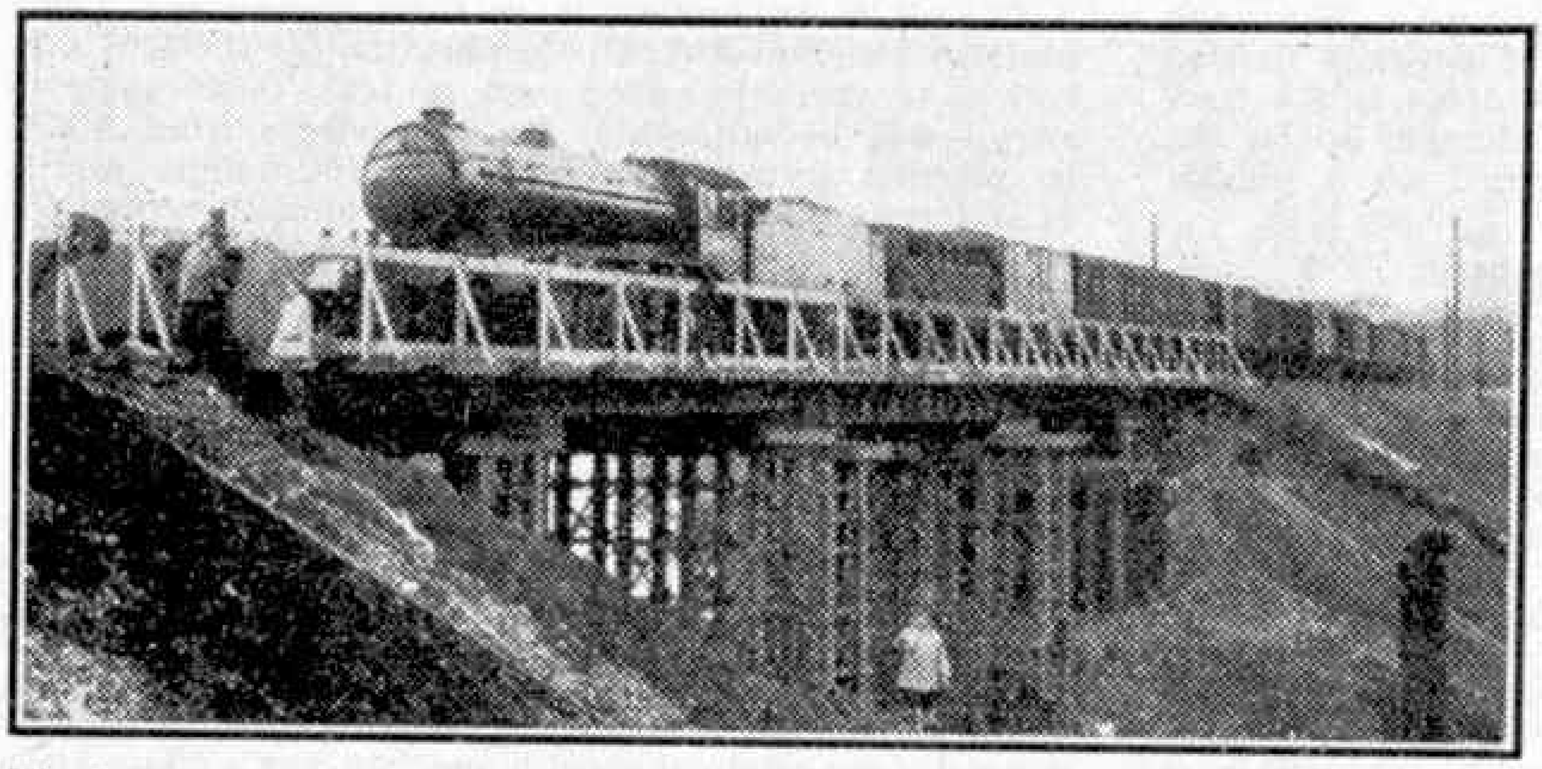
Peter Scott, Director of The Severn Wildfowl Trust, and the assistant secretary, watching wild geese from one of the observation huts.

Scottish Region Bridge Renewals

THE pictures here show three different stages in the renewal of Bridge No. 133, or Free Kirk Bridge, one of the seven Scottish Region bridges between Grantshouse and Reston that were totally destroyed in the serious floods of August 1948. The East Coast main line was breached on the important Berwick-Dunbar section, but temporary steel bridges of military type permitted traffic to be resumed on the route in the following October. These bridges were erected in such a way that the building of concrete abutments and wing-walls for the permanent bridges could proceed without causing further interference with traffic.



After the floods of August 1948. Free Kirk Bridge, between Grantshouse and Reston, Scottish Region, is washed away. British Railways Official Photographs.

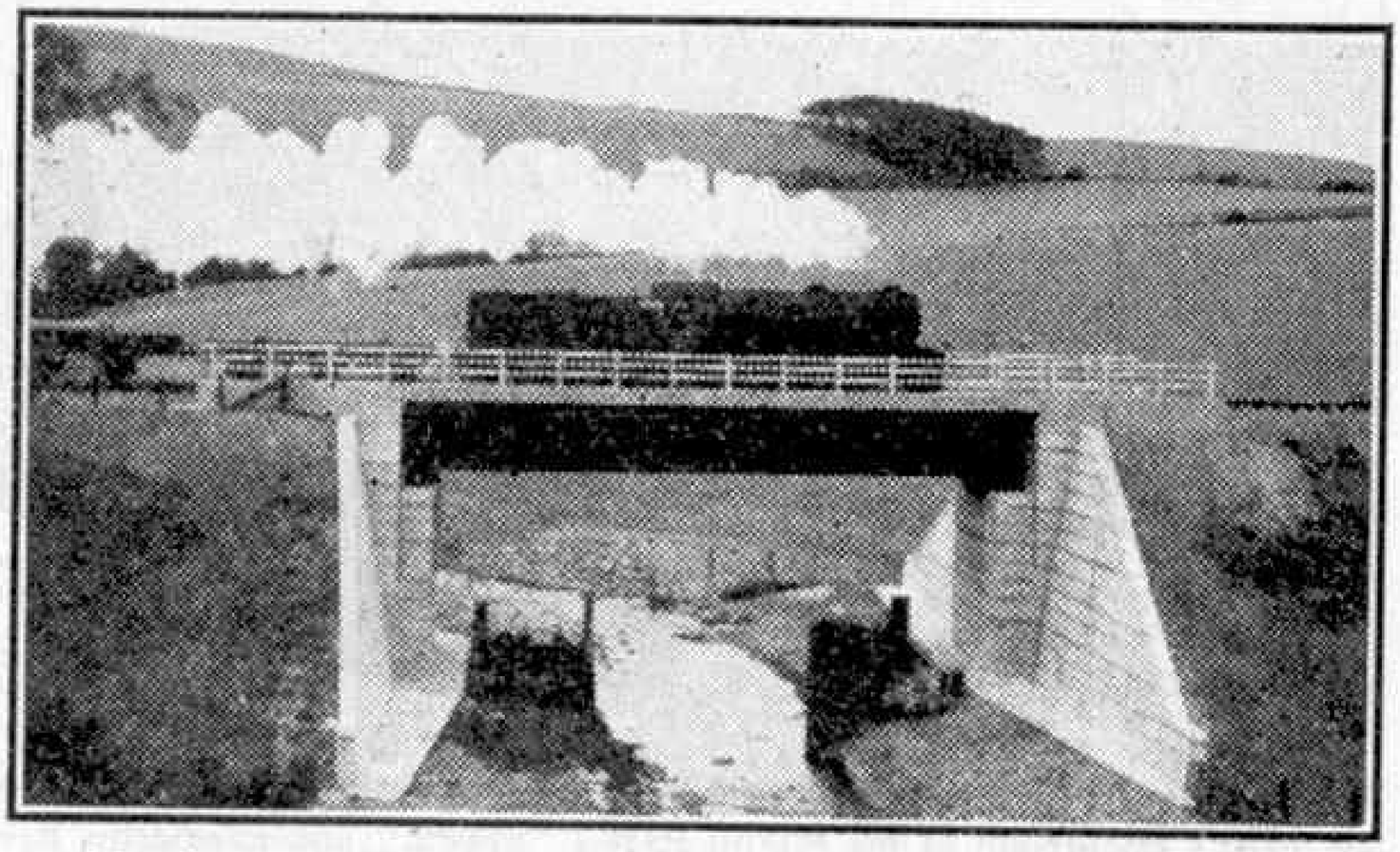


The temporary structure at Free Kirk Bridge, showing the first train to cross it.

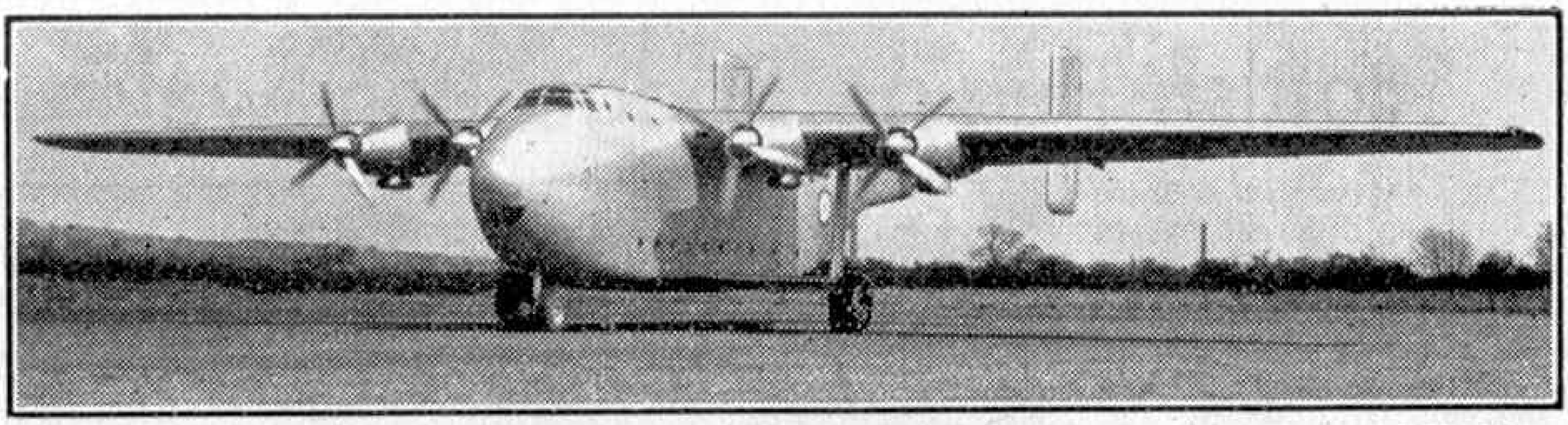
Six of the permanent superstructures are of the "deck" type with one pair of steel girders under each line. The seventh bridge is of the "through" type. In the replacement of the "deck" type bridges two railway cranes removed the girders and the top portions of the steel trestling forming half of the temporary bridge carrying one line. The two new all-welded steel girders were brought forward and placed in position and pre-cast reinforced concrete units were then set on top of them to form a floor, on which the stone ballast and permanent way were laid. The other half of the temporary bridge was similarly dealt with.

In the replacement of the seventh bridge the new structure was prepared on staging to one side of the temporary bridge. Both up and down lines were removed by crane, and the new bridge, weighing about 350 tons, was pulled into position by hand winches over temporary runways.

The restoration work also included culvert reconstruction near Ayton and new concrete walls and a bridge near Burnmouth.



Repairs completed; the permanent new bridge now in use.



The "Universal Freighter" is Britain's largest cargo-carrying aircraft. Photograph by courtesy of Blackburn and General Aircraft Ltd.

Air News

By John W. R. Taylor

Skycoach "Constellation"

Trans-World Airline have adapted one of their Lockheed "Constellations" to carry 81 passengers, so becoming the first company to use this luxury air liner for "Skycoach" services. To permit reduced fares and to make room for extra seats, the galley has been removed and meal service discontinued.

Although T.W.A.'s "Constellation" Skycoach normally flies with 81 passengers, it actually carried 114 persons, including 32 babies in arms and a crew of five, on its first flight, which is thought to be the largest number of people ever carried on a regular scheduled airline flight.

Britain's Biggest Freighter

The giant Blackburn and General Aircraft "Universal Freighter," illustrated above, is second in size only to the Bristol "Brabazon," and has been designed to carry over 15 tons of cargo or 90 tourist-class passengers for distances up to 500 miles. There is, consequently, little need to emphasise how useful it would be on short-haul operations such as the Berlin Air Lift, especially as it will land fully-loaded in only 375 yards.

Some idea of its size can be gained from the fact that its main freight hold is big enough to accommodate a single-deck motor coach. Loading is accomplished by means of a hydraulically-operated, built-in ramp under the aircraft's tail, up which motor vehicles can be driven into the 5,740 cu. ft. hold, which can be heated and ventilated to meet sub-Arctic conditions and insulated for sound and temperature. To make full use of the machine's great load-carrying capabilities, a second, removable deck can be fitted above the main deck when light cargo is carried.

The "Universal Freighter" has a wing span of 162 ft. and is powered by four Bristol "Hercules" engines. The prototype has been built as a military cargo-'plane, but its low operating cost of 10¾d. per ton-mile offers completely new standards of economy for civil air transport work.

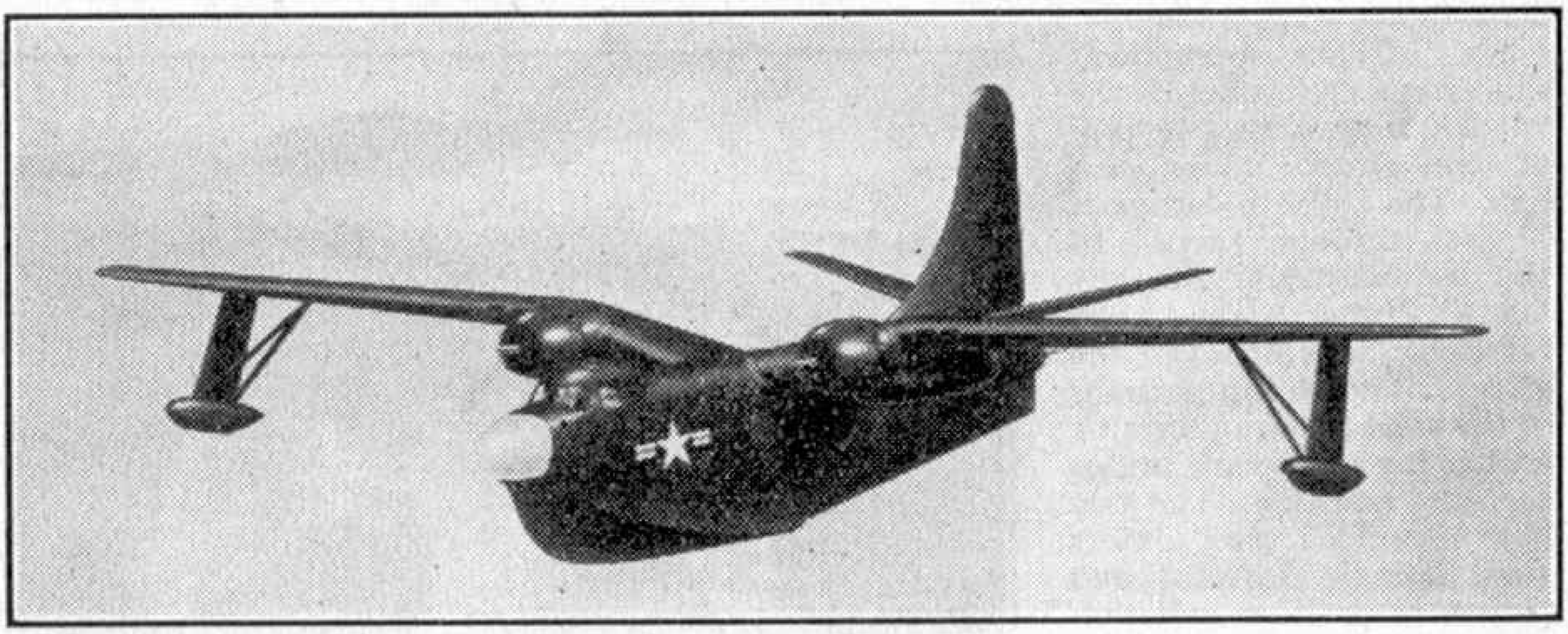
Variable Sweep-Back

The X-5 experimental research aeroplane being built by the Bell Aircraft Corporation for the U.S.A.F. will have variable sweep-back wings. Their angle of sweep will be adjustable by the pilot during flight, to provide information on the aerodynamic merits of different wing-shapes at sub-sonic and supersonic speeds. The X-5 is a development of the well-known X-1, first piloted aircraft to exceed the speed of sound.

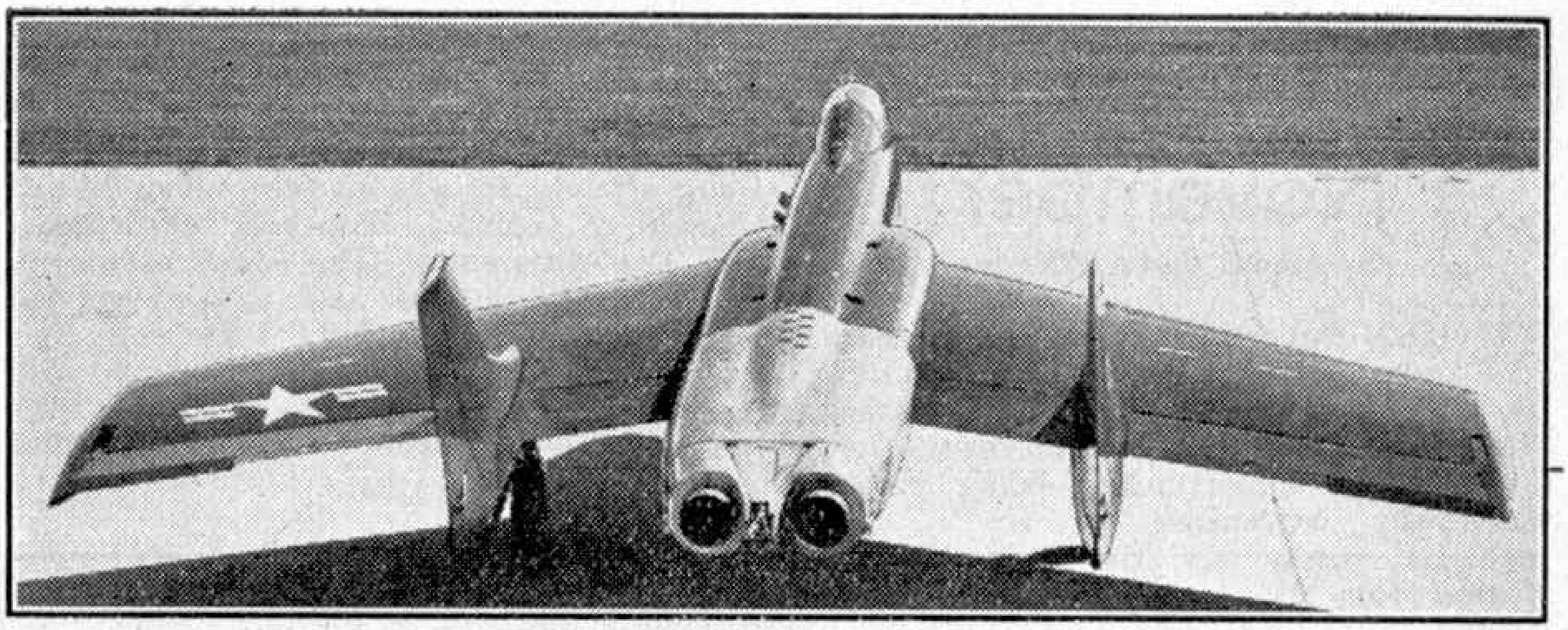
"Marlin" Flying Boats for U.S. Navy

As part of a programme to build up their anti-submarine forces, the U.S. Navy have ordered a substantial number of P5M-1 "Marlin" flying boats from the Glenn L. Martin Company. This follows more than two year's testing of the prototype XP5M-1, which flew for the first time on 13th May, 1948.

Like the famous Martin PBM "Mariner" from which it has been developed, the "Marlin" is a gull-winged, twin-engined monoplane, but has a completely new type of hull, with a very long after-body to improve landing and take-off characteristics, especially in rough water. It also has a single fin



An artist's impression of the Martin P5M-1 "Marlin" anti-submarine flying boat now in production for the U.S. Navy. Photograph by courtesy of the Glenn L. Martin Co., U.S.A.



Another new type on order for the U.S. Navy, the Chance Vought "Cutlass" twin-engined tailless jet-fighter.

and rudder compared with the twin surfaces of the earlier machine.

The "Marlin" will be powered by two Wright 3350 engines, but there seems little reason why it should not be fitted eventually with propjets. Apart from the fact that it carries a crew of seven, no details of its payload or performance may be given, but its operational equipment is stated to include "the latest electronic devices for submarine detection and destruction, including a bow radar scanner, and armament comprising both internal and external stores." Although intended primarily for anti-submarine work, it could be used also as a long-range troop and cargo transport.

Helicopter Orders

News of several important new Service contracts for U.S. helicopters is proof that rotating-wing aircraft have outgrown the novelty stage and are now regarded as highly practical military aircraft. As a start, Sikorsky were awarded an Air Force contract for five of their 10-passenger Model H-19 single-rotor machines, each powered by a 600 h.p. Pratt and Whitney engine. This was followed by a U.S. Navy order for 10 machines of the same type, which will receive the Naval designation H04S.

The Navy next ordered an undisclosed number of Kaman HOK-1 4-seat liaison-type helicopters, developed from the Kaman K-225, which is used by the U.S. Navy, Coast Guard and civilian operators. They will be convertible to ambulance machines with accommodation for two stretchers, and, like the K-225, will have two intermeshing rotors with servo-flap controls, making them simple and easy to fly.

Finally, the Piasecki Corporation have announced increased Naval orders for their HUP-1 helicopter and a further U.S.A.F. contract for the H-21 (Air Force counterpart of the HRP-2), all of which have the usual Piasecki tandem-rotor "flying banana" layout.

The "Cutlass"

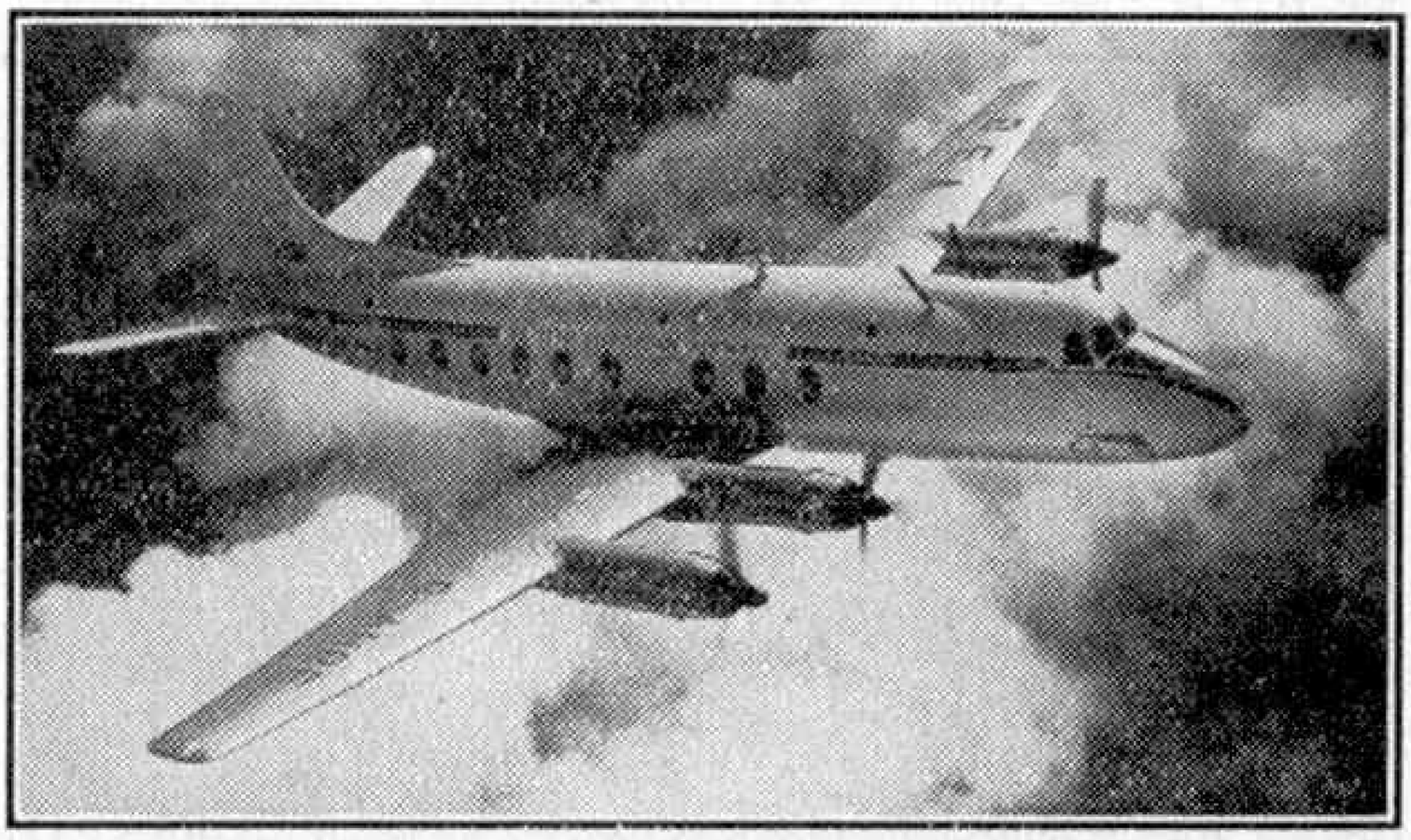
The unorthodox Chance Vought F7U "Cutlass" jet fighter, illustrated above, is the first swept-wing aircraft to go into production for the U.S. Navy, and is also one of the most advanced and fastest aeroplanes in the world. Instead of a fuselage tail assembly, it simply has twin fins and rudders at the trailing edges of its wings. Longitudinal and lateral control are obtained through the use of a pair of "ailavators"—combined ailerons and elevators—which are hydraulically-boosted to reduce pilot fatigue. Instead of conventional flaps, leading edge slats are used to reduce speed for landing on carrier-deck, and speed brakes are provided at the wing trailing edge to reduce speed further when required.

The "Cutlass" is powered by two Westinghouse J-34 jet engines, fitted with after-burners to give increased bursts of power and speed for short periods.

"Viscount" in Service

A total of 1,838 passengers were carried by the prototype Vickers "Viscount" propjet-powered air liner during its recent initial spell of operational duty on B.E.A.'s London-Paris and London-Edinburgh routes. It completed 36 return flights on the French service, during which it carried 1,516 passengers, followed by eight flights to Scotland and back.

The fact that the "Dart"-engined "Viscount" was treated just like any other air liner during these operations is the best possible answer to the pessimists who predicted that present-day methods of air traffic control would be useless when jets came into service. The only noticeable differences were that it flew much faster than the usual piston-engined air liners, and that passengers commented on the smoothest, quietest flight they had ever experienced.



Vickers "Viscount," the first jet air liner in the world to be used in normal passenger service. It is seen here with B.E.A. markings.

Camera Work in November

By John J. Curtis, A.R.P.S.

WHEN November arrives many readers put their cameras away thinking that photography for the year is finished. This is a great mistake and results in a lot of good opportunities being missed. Obviously November is not as sunny as the period from May to September, yet there are a few hours of daylight each week when the camera can be used. I suggest therefore that you should buy another spool and see what you can achieve by adopting the following suggestions.

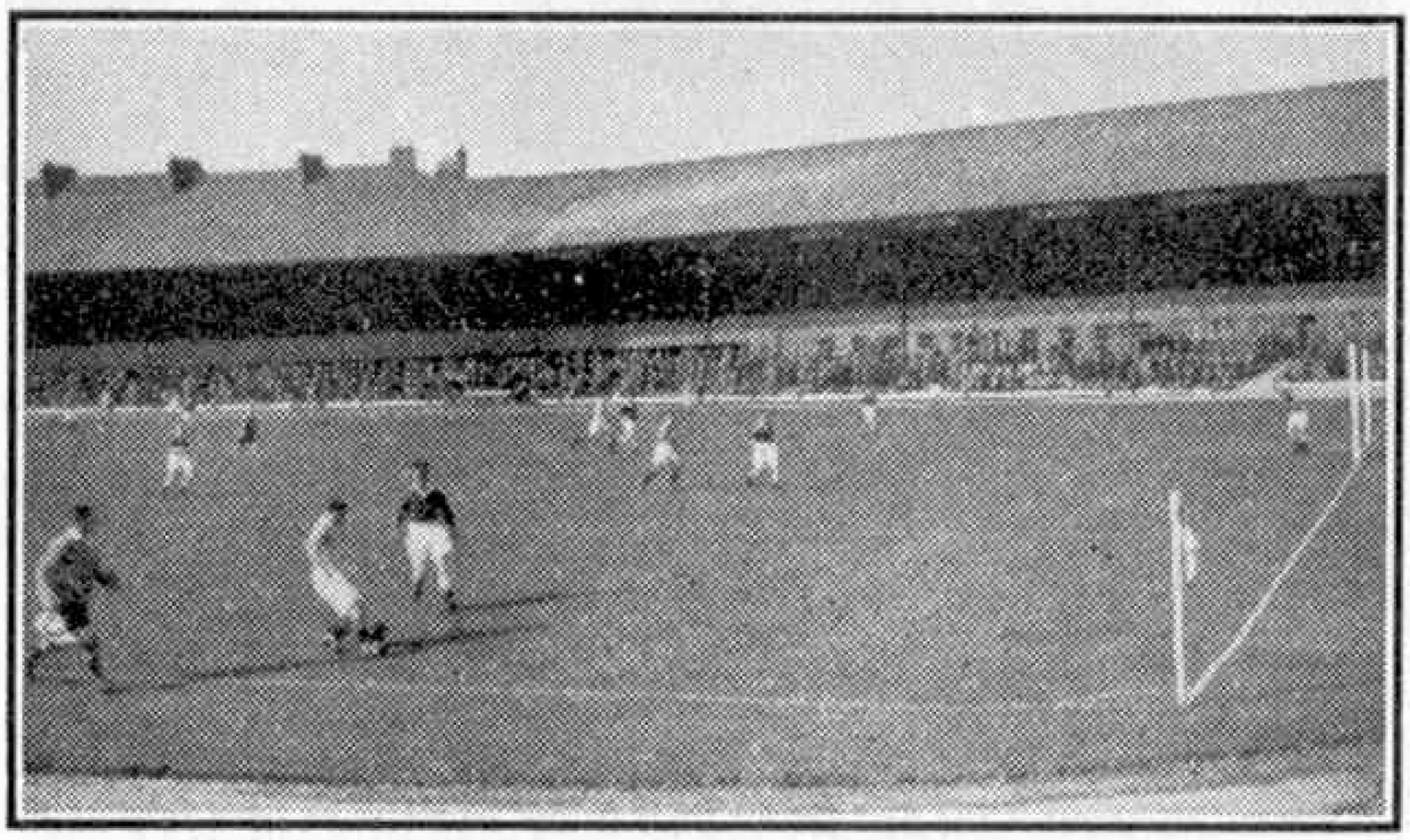
To those living near woods or parks and open spaces where trees are plentiful, I strongly advise making a special effort to secure pictures of the morning sunshine through the more or less leafless trees, particularly the elms with the delicate tracery of their twigs. If there should be slight mist, so much the better.

The morning mist at this time of the year produces effects quite different from those occurring during the summer months. For instance, photographs of churches, farmhouses, old-fashioned cottages, and other interesting buildings take on quite a fascinating appearance under the combined effects of sunshine and light mist. Try the effect of photographing under these conditions a building of which you already have a picture taken in the height of summer. You will be surprised at the difference. The mist seems to soften the outlines and to produce an almost mysterious effect. I am sure that after a few experiments of this kind you will realise that November photography can be as successful in its way as that of the lighter months.

Sunshine and mist. Photograph by J. J. Curtis, A.R.P.S.

For those living near a busy river or canal there are ample opportunities in this combination of sunshine and mist. Scenes that are almost ugly when taken in summer sunshine can become quite fascinating at this time of year.

Although it is quite a while to Christmas, it is time to begin thinking about turning one or two of your best prints into Christmas cards for your friends. There is no need to go to a lot of expense about these. Good gaslight prints can be made very attractive by printing across the bottom of one corner two or three words of greeting. Such prints, posted in unsealed envelopes, give a great deal of pleasure to one's friends, especially if the subject of the picture is one that is familiar to the recipient, recalling some pleasant or amusing incident.



The football match. Photograph by T. Mahoney, Dundee.

Club and Branch News

WITH THE SECRETARY

MODEL-BUILDING POINTS

During the present session model-building competitions are being held regularly in practically every Club, and in most of them a definite series of contests of this kind is in progress. In many cases the prizes are small sums of money; in others Meccano Parts are the rewards of good work. Occasionally more novel ways are adopted. A good example is a scheme suggested in the Borden Grammar School M.C. The winners of competitions arranged in this Club are to be rewarded by special visits to such outstanding events as the Motor Show and model engineering or railway exhibitions.

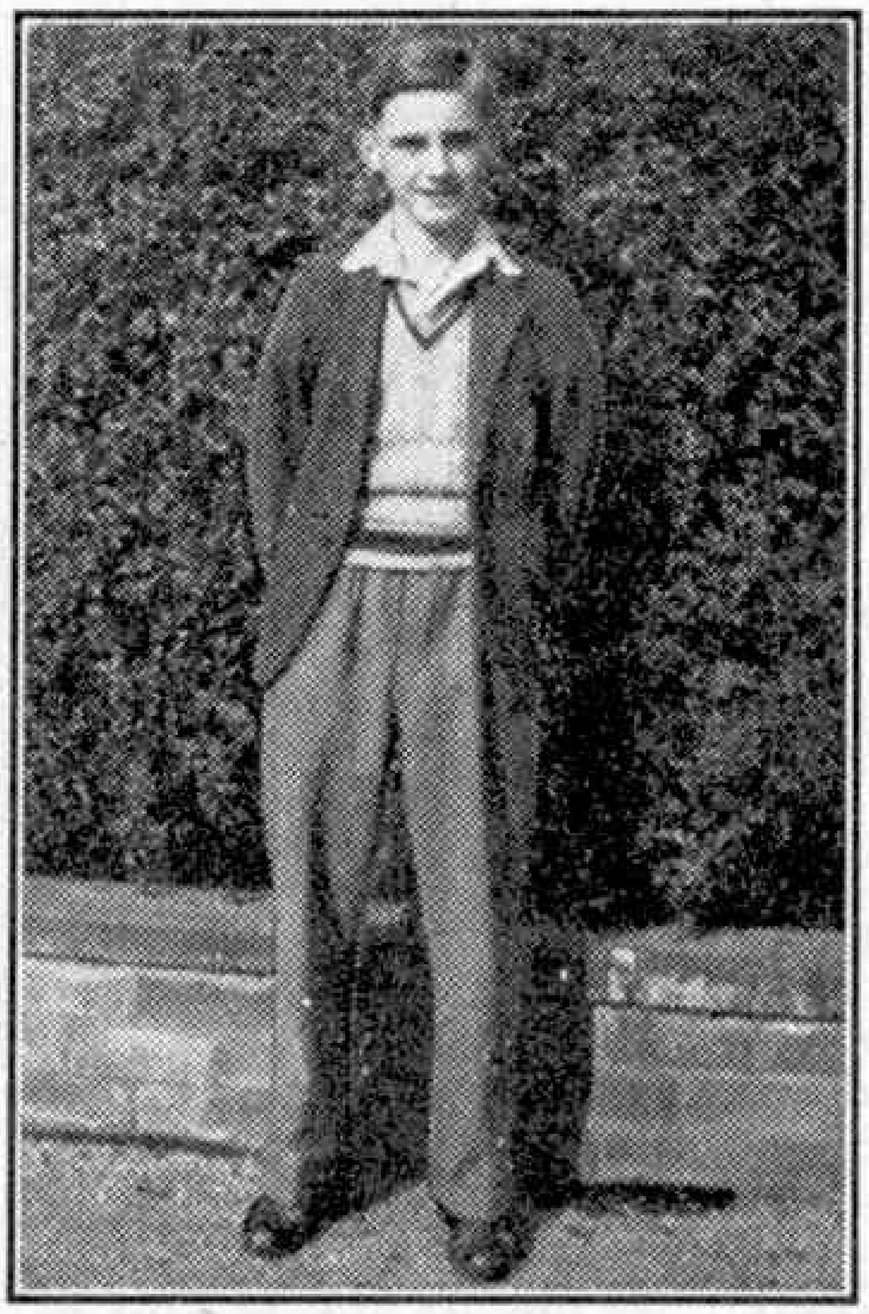
Another point that has to be settled is whether to arrange prizes for each contest, or to base awards on the results attained in a series. One plan that I can recommend is to arrange monthly prizes. Marks are given to each entry in the various contests held during the month, and those members who secure the highest number of points in that period are the winners. This may be varied by making the entire Session the unit instead of the single month, a plan that might well be followed when the number of members in the Club is comparatively small.

In Clubs of large membership the competitions should be carried on in age groups so that the youngest members are not crowded out. The youngest members of any Club indeed should be given as much encouragement as possible, and one way of ensuring this is to arrange special competition sections for them, with careful selection of suitable subjects.

SOMETHING TO STRIVE FOR

With games and social events to create the right spirit, and with carefully arranged competitions to give opportunities for good model-building, the central feature of the Club programme, no Club should have any difficulty in keeping its members busy and interested, as they will have something definite to strive for. A further incentive is provided by the Guild Merit Medallion. This is the highest award in Club life. Two Merit Medallions in each Session are available in each Club. Their award is not confined to recognition of activities of the kind I have mentioned. They can indeed be presented for any good work on behalf of a Club, and skill in organisation, success in finding good new members and steady application to Club matters over long periods also can be recognised in this manner.

I particularly wish Leaders to keep this award in mind and to make good use of it. Nominations for the present Session should reach me before the end of December, and by that time I hope to receive from every Club Leader the names of two of his members deserving of this recognition.



R. Harris is Secretary of the Hornsea M.C., Leader, Mr. R. W. Shooter. He has been a member of the Club for eight years, and before taking up his present post he was Sports Secretary. Recruiting has been one of his many activities and he is the holder of a Merit Medallion.

CLUB NOTES

MILE END (PORTSMOUTH) M.C.—A successful Exhibition has been held, and a display of models was arranged for a Garden Party in aid of the British Sailors' Society Guild, on which members were highly congratulated. A small band has been formed and a Variety Concert has been given. A successful Jumble Sale has increased the Club's resources. An office printing set has been bought. Club roll: 19. *Secretary:* Mr. A. J. Nicholson, 213, Sultan Road, Buckland, Portsmouth.

SOUTH BIRMINGHAM M.C.—This recently affiliated Club has made an excellent start. Most of the meetings have been devoted to model-building. At one of them fairground models were brought by members for entry in a Competition. Hornby-Dublo Train Operation also has been enjoyed. Club roll: 32. *Secretary:* Mrs. P. C. Field, 65, Barton Lodge Road, Birmingham 28.

BORDEN GRAMMAR SCHOOL M.C.—An excellent programme is in operation. It includes a series of Model-building Competitions, in which the prizes take the novel form of trips to such events as the Motor Show and the Schoolboys' Own Exhibition. A Library of bound volumes of the "*M.M.*" is being formed. The Summer Session was brought to an end with games and a "Twenty Questions" meeting. Club roll: 15. *Secretary:* Mr. S. Wood, 20, Harold Street, Queenborough, Kent.

HUNTINGDON M.C.—A very full programme has been followed. A display made at an Exhibition organised by the Huntingdon Rotary Club was admired by 2,500 visitors. Visits have been paid to Water Works and Gas Works, and work on the Club's Hornby-Dublo Railway has continued. Club roll: 50. *Secretary:* Miss J. Stocker, Minnie Mead, Offord Darcy.

BELGRAVE UNION (LEICESTER) M.C. — Members have been really busy with Model-building, and there was a grand display at the Club's Exhibition, which also included two Hornby Railways and two Hornby-Dublo layouts. Refreshments were provided for visitors. Club roll: 32. *Secretary:* Mr. C. G. Smith, 20, Aneford Road, Leicester.

BRANCH NEWS

WATERLOO (DUBLIN)—Intensive regular services and "specials," for passengers, goods and livestock, continue to be run regularly on the Branch layout. Full notices of working are issued to members. On one occasion every Railcar, Trailer and Coach had to be used to provide the trains required. A special model has been constructed of the County Donegal Railways Diesel railcar No. 19 described elsewhere in this issue. *Secretary:* Mr. S. J. Carse, 38, Oakley Road, Ranelagh, Dublin.

Using the Meccano Gears Outfit "A"

A Planing Machine Built from Outfit No. 5

THE illustration on this page shows a metal planing machine that can be built with Outfit No. 5 and a Gears Outfit "A." The model is fitted with a simple quick-return motion on the idling stroke of the table, and the position of the cutting tool can be varied by screw adjustments.

The base of the model is constructed first. This consists of two 12½" Angle Girders 1, connected by a 5½" × 2½" Flexible Plate and a 5½" Strip at each end. The sides are extended upward by 2½" Strips 2, to which are bolted three 12½" Strips. Two 5½" Strips are attached to the Strips 2 by Angle Brackets, and to them the two 12½" Angle Girders forming guide rails for the table are attached by Reversed Angle Brackets. The table is formed by bolting two 2½" × 2½" Flexible Plates to a 2½" × 1½" Flanged Plate 3. Two 2½" × ½" Double Angle Strips are bolted to the 2½" × 2½" Flexible Plates to keep the table on the rails.

The movement of the table is hand-driven through a Crank Handle, which is mounted in one side of the base and in a 5½" Strip 4. This Strip is bolted to the base by a 1½" × ½" Double Angle Strip 5, and by a 1" × 1" Angle Bracket to the 5½" Strip at the end of the base. A ¾" Pinion is fixed on the Crank Handle and engages with a 50-tooth Gear Wheel on a 3½" Rod 6. The compound strip 7, consisting of a 3½" Strip and a 2½" × ½" Double Angle Strip overlapped, is attached to one side of the base by a 1" × 1" Angle Bracket and to the other by the lug of the Double Angle Strip.

A 2" Rod 8 is mounted in this strip and in a Double Bent Strip bolted to it. Rod 8 is held in place by a ¾" Sprocket Wheel and a Cord Anchoring Spring and carries a 1½" Contrate Wheel which meshes with a ¾" Pinion on Rod 6. A Double Bracket 9 is pivotally attached to the 1½" Contrate Wheel by a ½" Bolt that also carries a ½" loose Pulley on its shank. A 3½" Strip is loosely mounted between the lugs of the Double Bracket and is attached by a lock-nutted Bolt to a 5½" Strip, which is pivotally attached to a Double Bracket bolted to the underside of the table. The other end of the 3½" Strip is attached to the rail by a Pivot Bolt 10.

The column is built by bolting two Flanged Sector Plates to the sides of the base and extending them by three 5½" Strips and two 2½" Strips. The Plates are braced by a 5½" Strip 11 and connected at the top by a 5½" Strip and a compound Strip 12 consisting of two 2½" × ½" Double Angle Strips connected by a 1½" Strip.

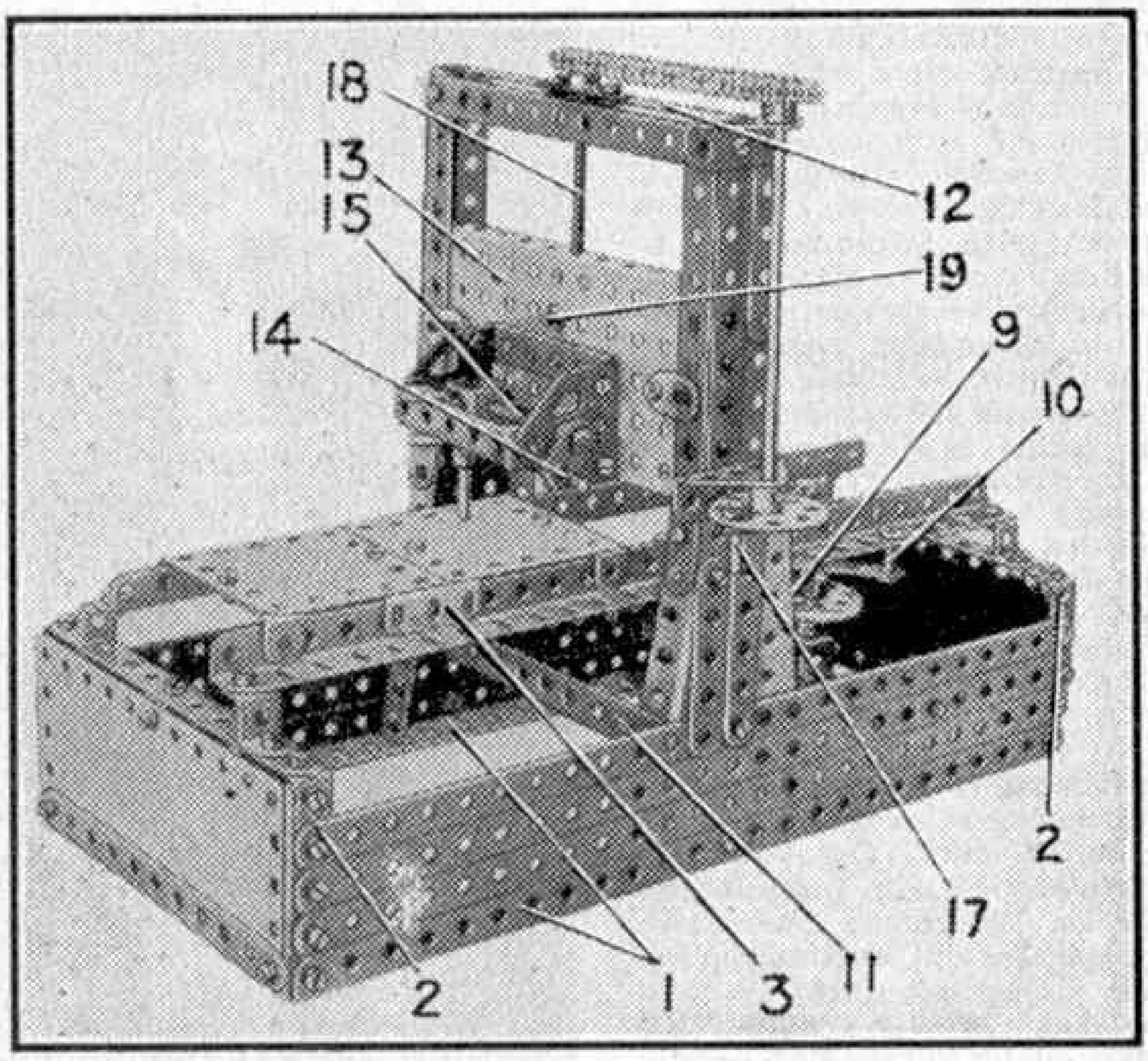


Fig. 1. A model of a metal planing machine that can be constructed with the parts in Outfit No. 5 and a Gears Outfit "A."

The tool saddle consists of two Flat Trunnions bolted to two 2½" × ½" Double Angle Strips, which are fixed to a 5½" × 2½" Flanged Plate 13, representing the slide.

The tool is traversed across the work table by turning the handle 14. This is formed by locking a Fishplate, fitted with a ½" Bolt, to the end of a 3" Screwed Rod 15, and is spaced from the Flat Trunnion by three Washers. The 1" Rod representing the cutting tool is held in a Rod and Strip Connector, which is attached to a Double Bracket 16 by a ½" Bolt. This bolt also holds a second Double Bracket that engages a 2½" × ½" Double Angle Strip

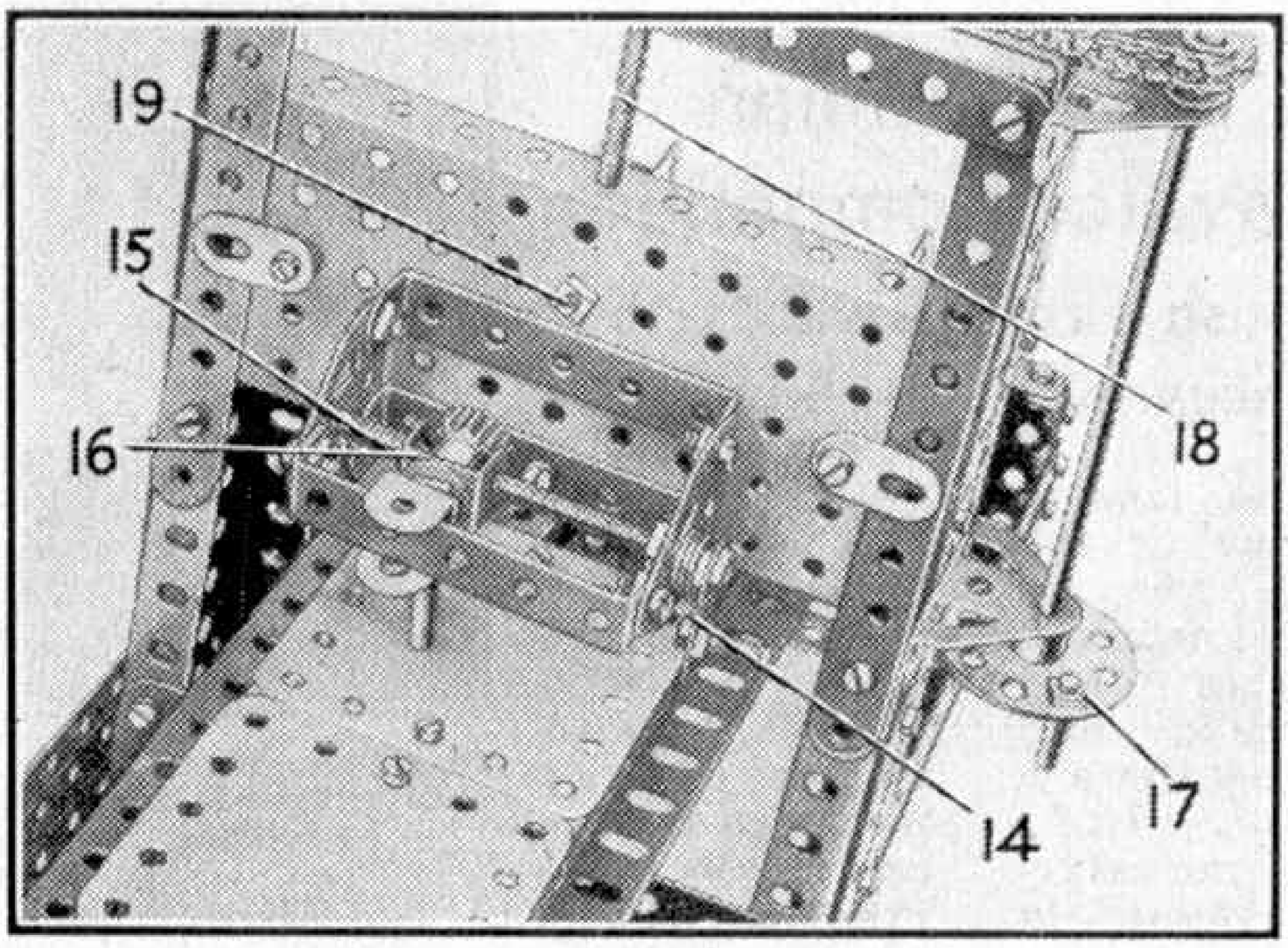


Fig. 2. A close-up view of the saddle and tool holder of the planing machine.

attached to the Flat Trunnion and prevents the cutting tool from rocking. The Screwed Rod is passed through the Bracket 16 and through the tapped hole in the boss of a ½" Pinion. Two nuts locked together hold the Screwed Rod in place.

The Flanged Plate 13 is held loosely by two Fishplates spaced from the Plate by two Washers, and is raised and lowered by the handle 17. This handle consists of a Threaded Pin attached to a Bush Wheel locked on a 5" Rod, bearings for which are provided by two Trunnions bolted to the side of the column. A ¾" Sprocket Wheel on the 5" Rod is connected by Chain to a similar part locked on the end of a 3" Screwed Rod 18. This Rod is screwed into the boss of a ½" Pinion, which is clamped between the flange of Plate 13 and an Angle Bracket attached to the Plate by Bolt 19.

Parts required to build model Planing Machine: 6 of No. 1; 14 of No. 2; 2 of No. 3; 8 of No. 5; 1 of No. 6a; 4 of No. 8; 4 of No. 10; 4 of No. 11; 12 of No. 12; 2 of No. 12a; 1 of No. 15; 1 of No. 16; 1 of No. 17; 1 of No. 18b; 1 of No. 19g; 2 of No. 22; 1 of No. 23; 1 of No. 24; 8 of No. 37; 18 of No. 37a; 10 of No. 38; 1 of No. 45; 1 of No. 48; 8 of No. 48a; 1 of No. 51; 1 of No. 52; 2 of No. 54; 2 of No. 80c; 2 of No. 111a; 1 of No. 111c; 1 of No. 115; 4 of No. 125; 2 of No. 126; 2 of No. 126a; 1 of No. 147b; 1 of No. 176; 2 of No. 190; 2 of No. 192; 1 of No. 212; 1 Gears Outfit "A."

PRIZES FOR MECCANO MODELS

Readers are reminded that there is still time to enter the General Model-Building Competition announced in last month's *"M.M."* In this contest cash prizes will be awarded to model-builders submitting the best designed and most attractive models. There are no restrictions in the number of parts that may be used, and models may be based on any subject, but readers should remember that mere size does not influence the awarding of the prizes in any way. The judges are more likely to be impressed by a small model showing clever and unusual uses of Meccano parts, than by a large but poorly designed model Owners of small Outfits need not hesitate therefore to send in their entries, and as the winter model-building season is now well under way we look forward to a record entry.

After the model is completed all that is necessary is to obtain a good photograph or a clear sketch of it, and send this to *"October General Model-Building Contest, Meccano Ltd., Binns Road, Liverpool 13."* A few notes covering any special points or features of the model not readily apparent from the illustration should be added, and the competitor's age, name and address must be written on the back of each entry.

The competition will be divided into two sections: A, for readers living in the British Isles: B, for Overseas readers. The following prizes will be awarded in each section. First, Cheque for £3/3/–; Second, Cheque for £2/2/–; Third, Cheque for £1/1/–. In addition there will be five prizes consisting of Postal Orders for 10/6, and five of Postal Orders for 5/–. The closing dates are, Home Section, 30th November; Overseas Section, 31st March, 1951.

All prizewinners will be notified by letter as soon as possible after the respective closing dates in each Section.

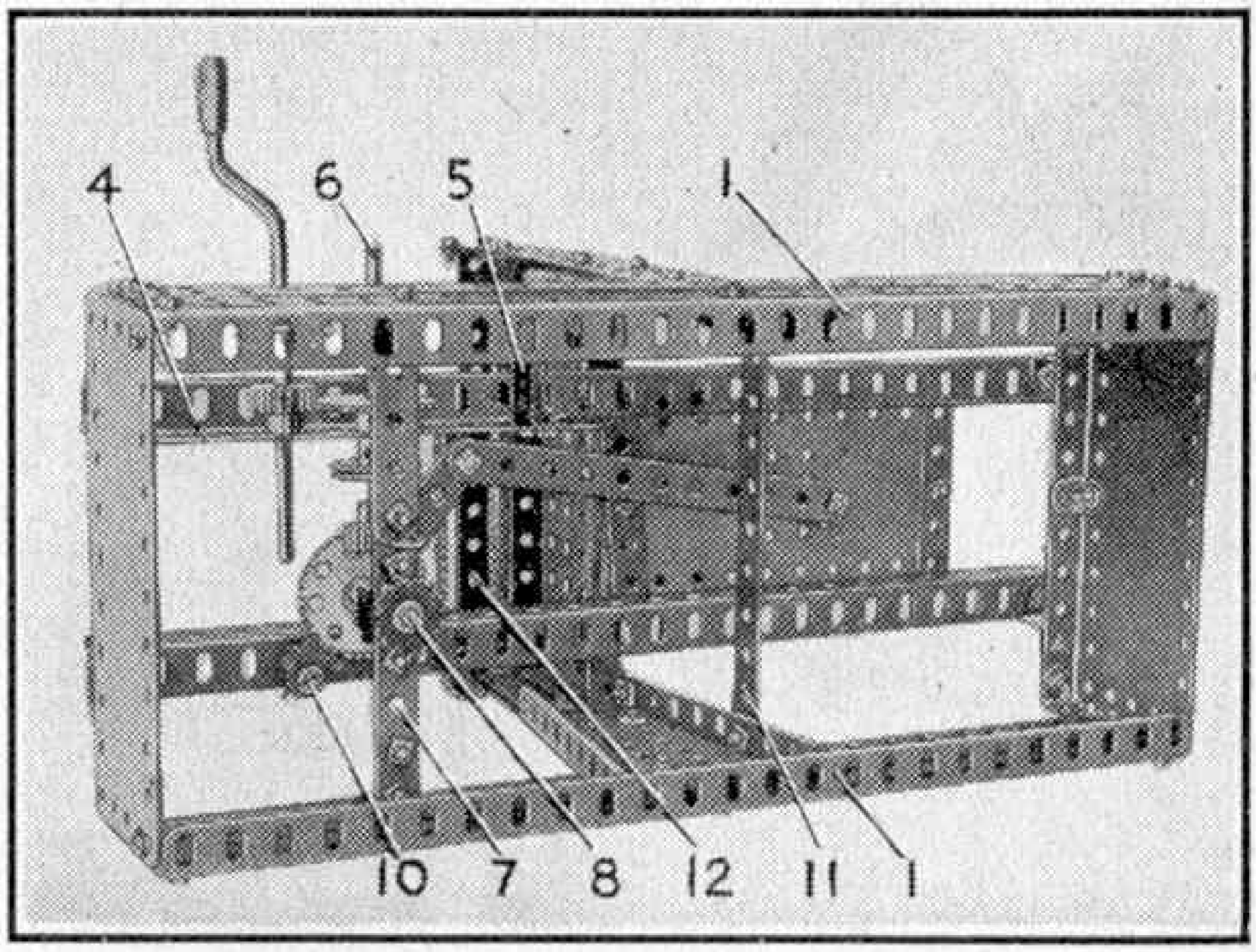


Fig. 3. An underneath view of the planing machine showing the quick-return stroke mechanism that operates the reciprocating movement of the table.

B. R. Lay, Horsham, winner of Second Prize in the Home Section.

The Priestman Excavator Competition

British Firm's Awards to Meccano Model-Builders

David Green, Halifax, winner of Third Prize in the Home Section.

IN the January issue of the *"M.M."* we announced details of a special competition in which Priestman Brothers Ltd., Hull, manufacturers of cranes and excavators, in conjunction with Meccano Ltd., offered a fine range of cash prizes for the best Meccano models of the *"Wolf"* Excavator, one of the many well-known Priestman products. Cranes and excavating machines of all kinds have always been favourite subjects with Meccano model-builders, and this was demonstrated once again in the splendid work done by many of the competitors in this Contest, and the fact that entries were received from all parts of the world.

Judging, which proved a difficult task owing to the high standard reached by many of the entries in both the Home and the Overseas Sections, was undertaken by Priestman Bros. Ltd. and Meccano Ltd. jointly, and after very careful consideration it was decided that the awards should be as follows:

HOME SECTION

First Prize, £6/6/–, Sgt. R. Jarvis, Arundel. Second Prize, £4/4/–, B. R. Lay, Horsham. Third Prize, £2/2/–, D. A. Green, Halifax.

Prizes of 10/–: R. H. Loveridge, Leeds 6; C. A. Wadley, Reading; K. Nicholas, Whitchurch, Cardiff; J. Richardson, Penkridge; R. A. Sherman, Lancing; E. Lynton, Brighton 7; P. Lewis, Flamborough; J. E. Matthews, Fillongley, Warwicks; C. E. Wrayford, Bovey Tracey, Devon; C. S. Fowler, Slough.

Prizes of 5/–: H. T. Bell, Dundee; A. M. Goodbody, Esher; K. F. Bartlam, Kington, Herefordshire; G. K. Appleyard, Birmingham 21; D. Priestley, Rushden, Northants; H. W. Henry, Rochester; D. V. J. Tyler, London N.21; Messrs. J. B. and A. C. Hall, Lewknor, Oxford; P. A. Prismall, Basingstoke; T. W. Gough, London N.15.

EXTRA SPECIAL MERIT AWARDS PRESENTED BY PRIESTMAN BROS. LTD.

B. R. Lay; E. Lynton; J. E. Matthews; P. Lewis; C. E. Wrayford; G. K. Appleyard; J. B. and A. C. Hall.

OVERSEAS SECTION

First Prize, £6/6/–, G. E. Vale, Grafton, New South Wales. Second Prize, £4/4/–, Lt.-Col. J. G. M. Keeling, B.A.O.R. 23. Third Prize, £2/2/–, R. Hassan, Alexandria.

Prizes of 10/–: C. B. L. Osborn, Demerara, British Guiana; R. Grigg, Caversham, Dunedin; W. Miskelly, Tangowakine, New Zealand; A. W. Dickie, St. Clair, Dunedin; M. Eldridge, Te Awamutu, Waikato, New Zealand; S. A. Brown, Pinelands, Cape Town; G. Burns, Warragul, Victoria, Australia, W. H. Johnson, London, Ontario; H. W. Kensley, Goodwood, Cape Province.

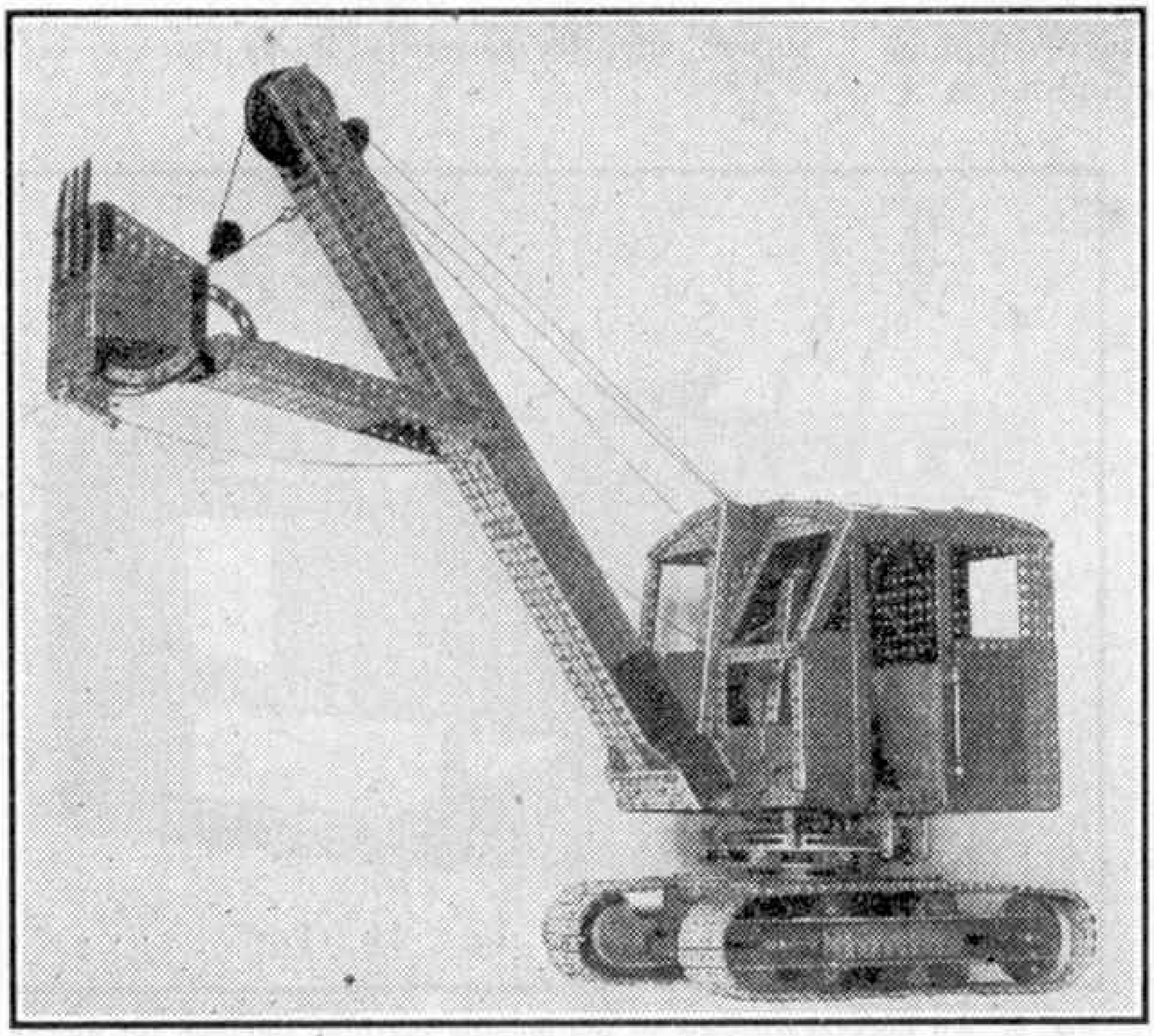


Fig. 1. The fine model built by Sgt. Jarvis, Arundel, for which he was awarded First Prize in the Home Section.

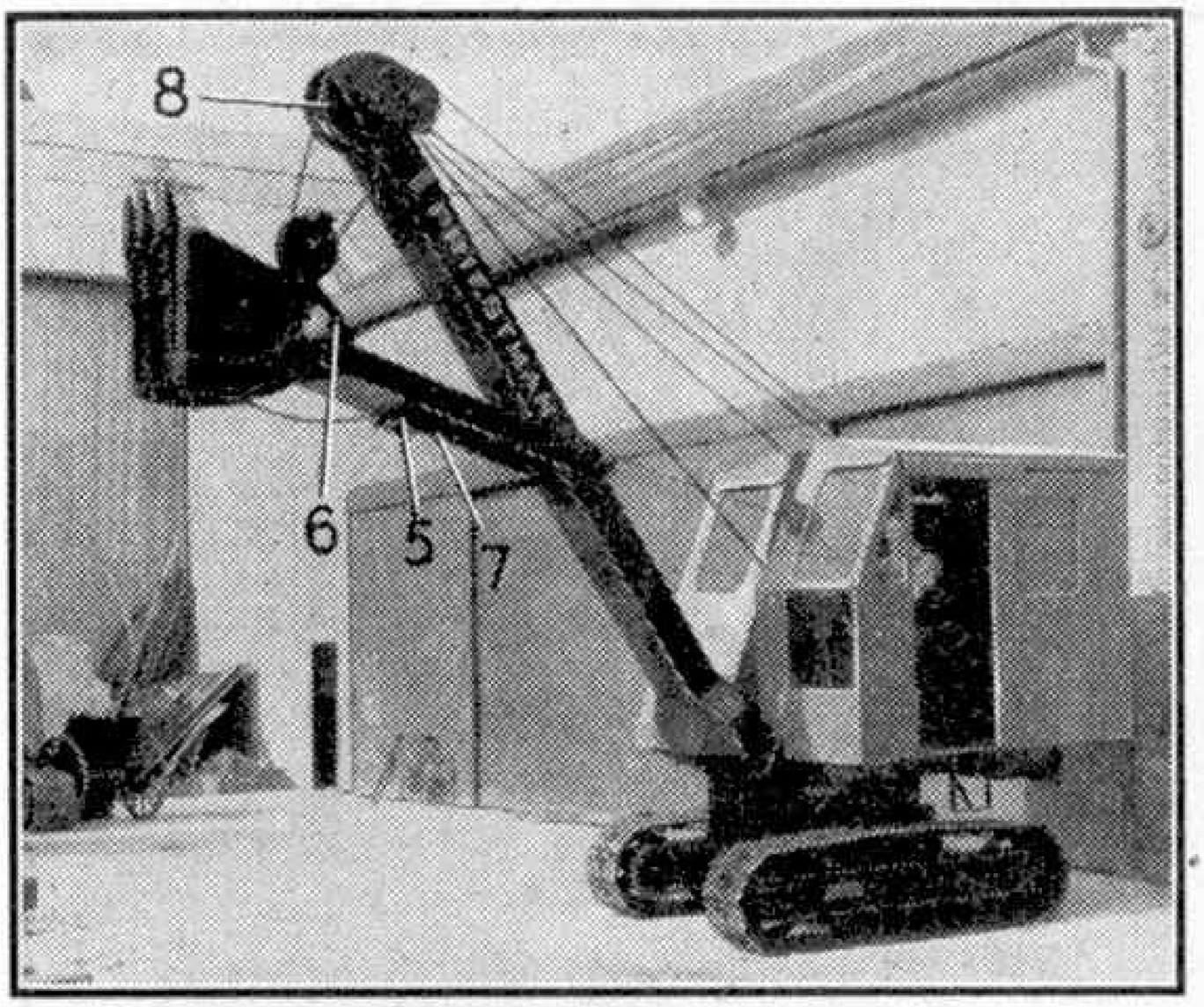


Fig. 2. The Priestman "Wolf" Excavator that formed the subject of the Competition.

Priestman Bros. Ltd. were very pleased with the general standard of the work done in both sections of the Competition and expressed their appreciation of the resource and skill of those who submitted entries. Many of the models that failed to win prizes were really excellent efforts, and their lack of success was entirely due to the outstanding merits and workmanship displayed by the winners.

Some difficulty was experienced in awarding the lower value prizes as many entries were of almost equal merit, although differing considerably in constructional details. The prizes were therefore awarded to those competitors who showed that they really understood the actual machine.

The model that won First Prize in the Home Section for Sgt. R. Jarvis was outstanding among other very praiseworthy efforts and it was very highly commended by the judges. Comparison of the model seen in Fig. 1. with the actual machine (Fig. 2) will reveal how closely the various features of the *"Wolf"* Excavator have been reproduced, and this fact, combined with skilful and neat workmanship, gave this model an undisputed claim to the highest award. The turntable on which the superstructure of the actual machine revolves is reproduced in the model by a Circular Strip that carries eight ½" Pulleys which run between two Hub Discs connected by 1½" Double Angle Strips. The cabin is attached to four Bolts fixed in the Circular Strip. The arrangement for swivelling the cabin on the undercarriage consists of a ½" Pinion mounted so as to project below the floor of the cabin and engage the teeth of a 3½" Gear Wheel secured to the upper Hub Disc.

The undercarriage tracks, which are neatly built up from 2½" Strips fixed to Sprocket Chain, are driven by a shaft that

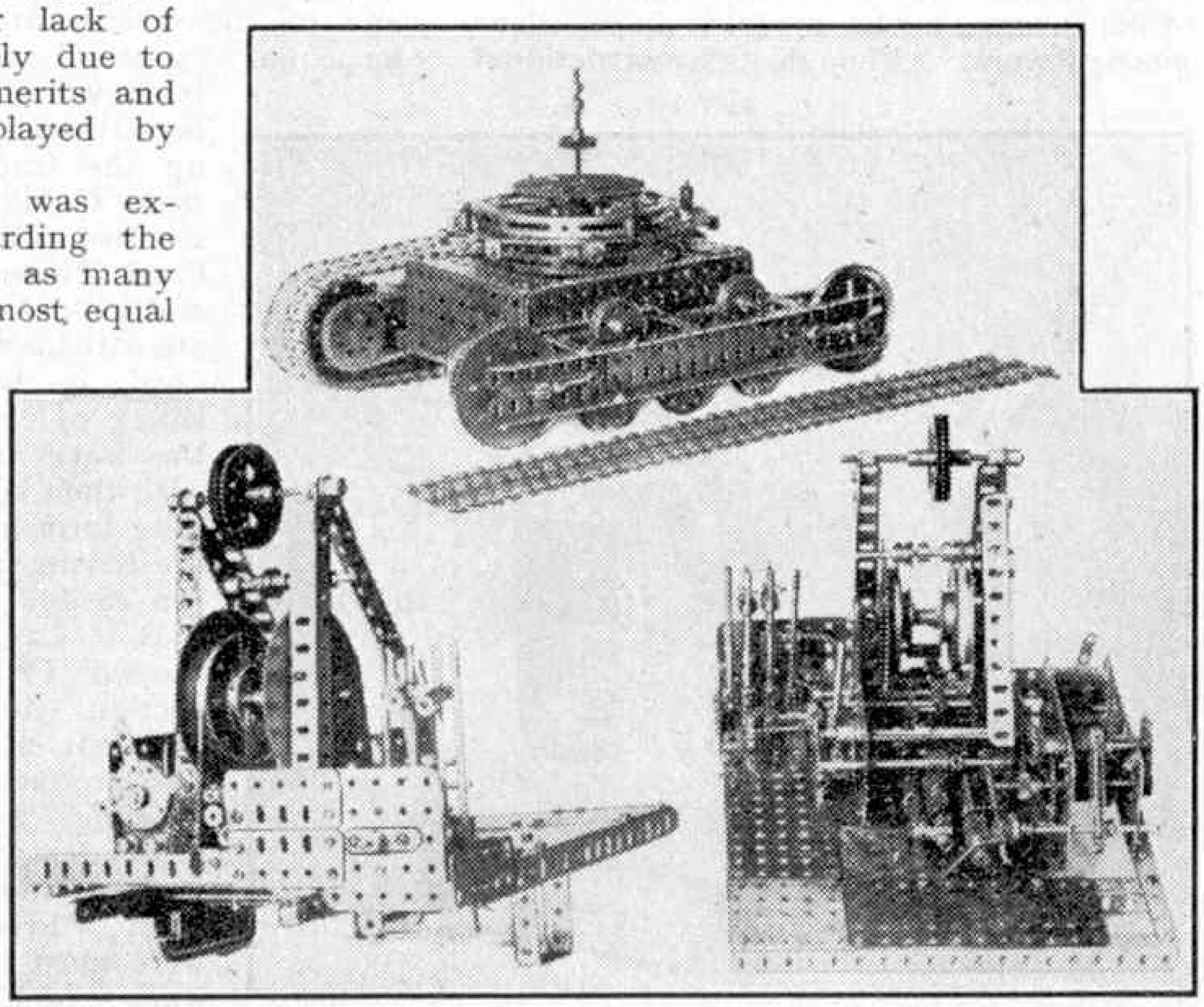


Fig. 3. These three illustrations show (top) the undercarriage and tracks, and (bottom) the winding and control mechanism of the model submitted by Sgt. Jarvis, Arundel.

runs through the turntable; and track steering is effected by a vertical movement of the drive spindle. This is operated by a pin on a crank, which engages between two Collars. By means of this arrangement either or both of two driven Pinions can be brought into engagement with Contrate Wheels fixed on the inner ends of the half axles, which in turn impart the movement to both or either track as desired.

The cab mechanism and control gear is very detailed, and some of its features can be seen in the composite illustration Fig. 3. It is not possible to describe fully all the various mechanisms, but means are provided for reproducing all the essential movements of the real machine. The driving power is obtained from an Electric Motor, and the cabin and jib are counterbalanced by a 10 lb. block of lead.

The winner of First Prize in the Overseas Section, George E. Vale, Grafton, N.S.W., has every reason to be proud of his success, for his model is an excellent piece of work. Although its constructional details differ in many respects from those of the model sent by Sgt. Jarvis, the various features of the actual machine and its movements are interpreted with an equal degree of realism. His model is shown in Fig. 5 and it will be noticed that Vale has built up the tracks for his model from 2″ Flat Girders attached to two lengths of Meccano Cord. These work satisfactorily and look realistic. The Girders are fitted with four Bolts. The Cord is wound round the shank of each bolt once, and the nuts are then tightened with their edges in line so that they form a channel in which the driving sprockets and rollers run easily.

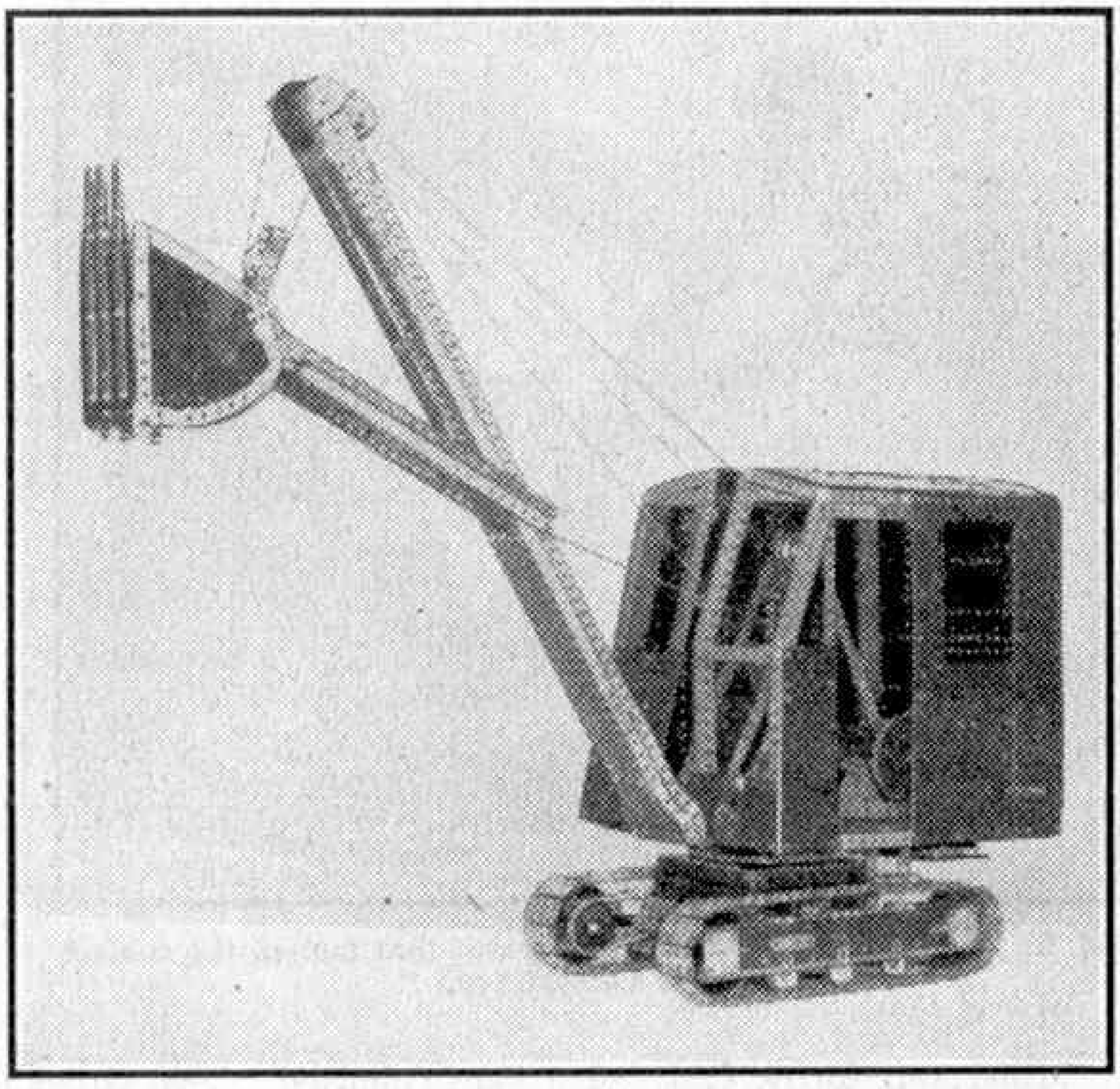


Fig. 5. First Prize in the Overseas Section went to George E. Vale, Grafton, N.S.W., who built the model shown above.

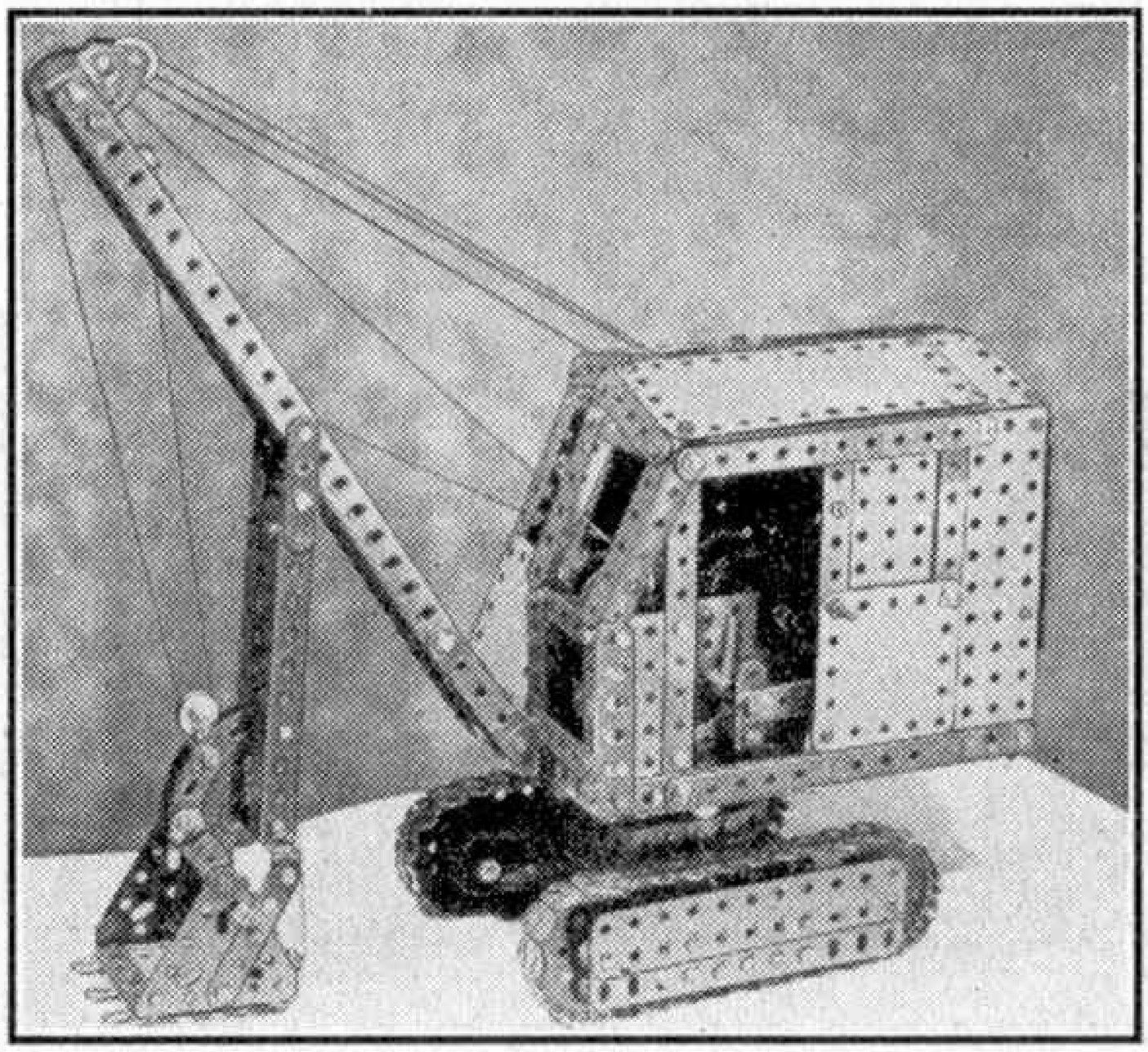


Fig. 4. This model won Second Prize in the Home Section. It was built by B. R. Lay, Horsham.

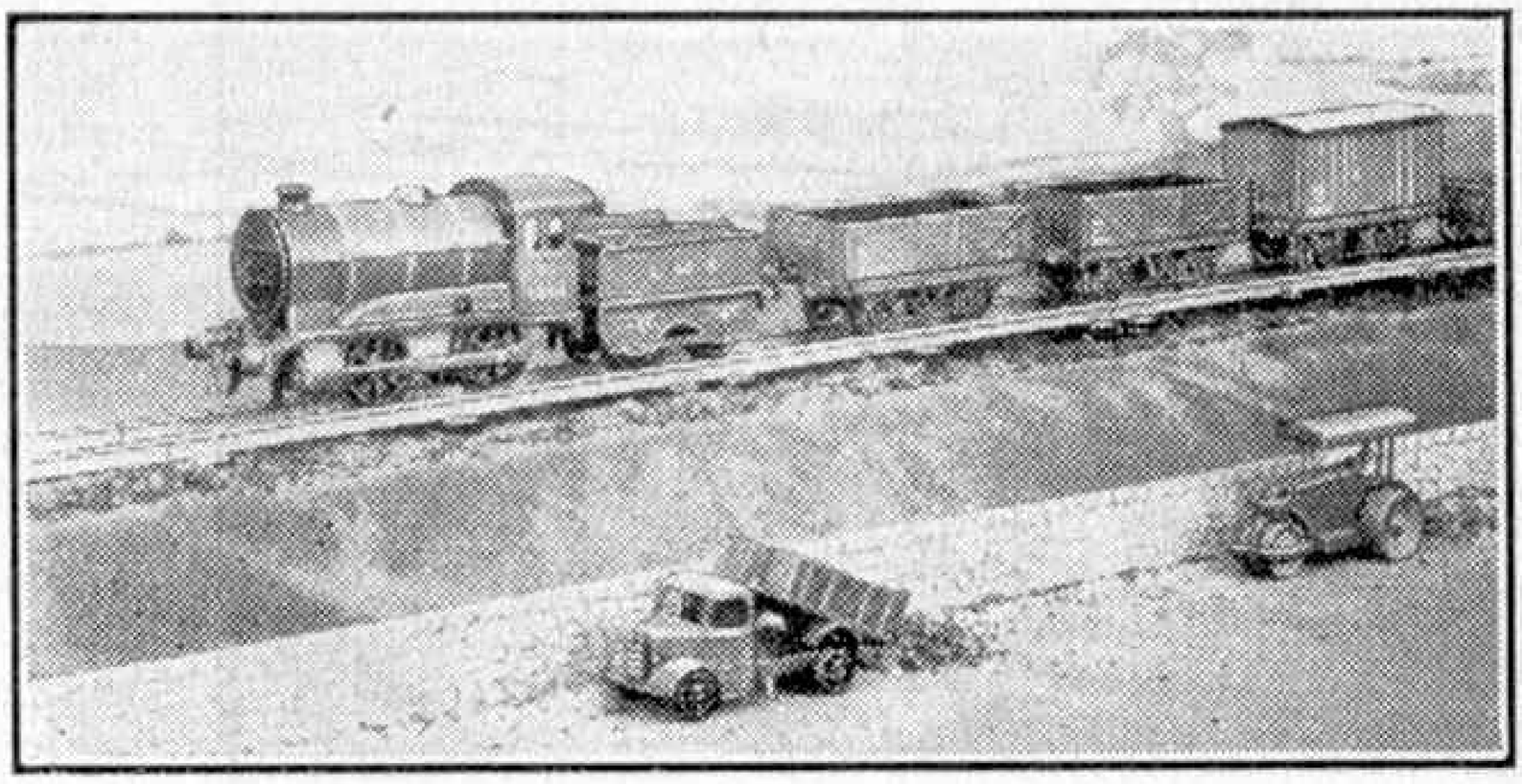
B. R. Lay, who was awarded Second Prize in the Home Section, not only made an excellent model (Fig. 4), but also produced some very good drawings of it, and went to a great deal of trouble in preparing and assembling his entry. Priestman Bros. Ltd. were most impressed with his work, and in appreciation decided to give him an extra special merit prize.

Lineside Fun on Hornby Layouts

IN operating a Hornby layout, even if this is of the ordinary portable kind, there are many more interests than that of simply running the train. Most Hornby railway owners do develop "sidelines" of this character, and the fun they get from their railwaying is thus increased.

A development that suggests itself is to use Dinky Toys or Supertoys motor vehicles to provide lineside or road atmosphere. Some of them are specially suitable for miniature railway purposes and can be used for the actual handling of "goods," so that this form of Hornby railway activity can be developed in a realistic manner. For instance, each of the three Supertoys Guy vehicles is useful for goods haulage purposes, and No. 512, the Guy Flat Truck is well adapted to taking Hornby Containers over the road stretch of their journey. Another type much used in actual railway service is represented by No. 521, the Bedford Articulated vehicle. The manœuvring of this unit in and out of the goods yard, and perhaps its backing up alongside a Hornby Wagon or the Goods Platform, is quite a fascinating operation.

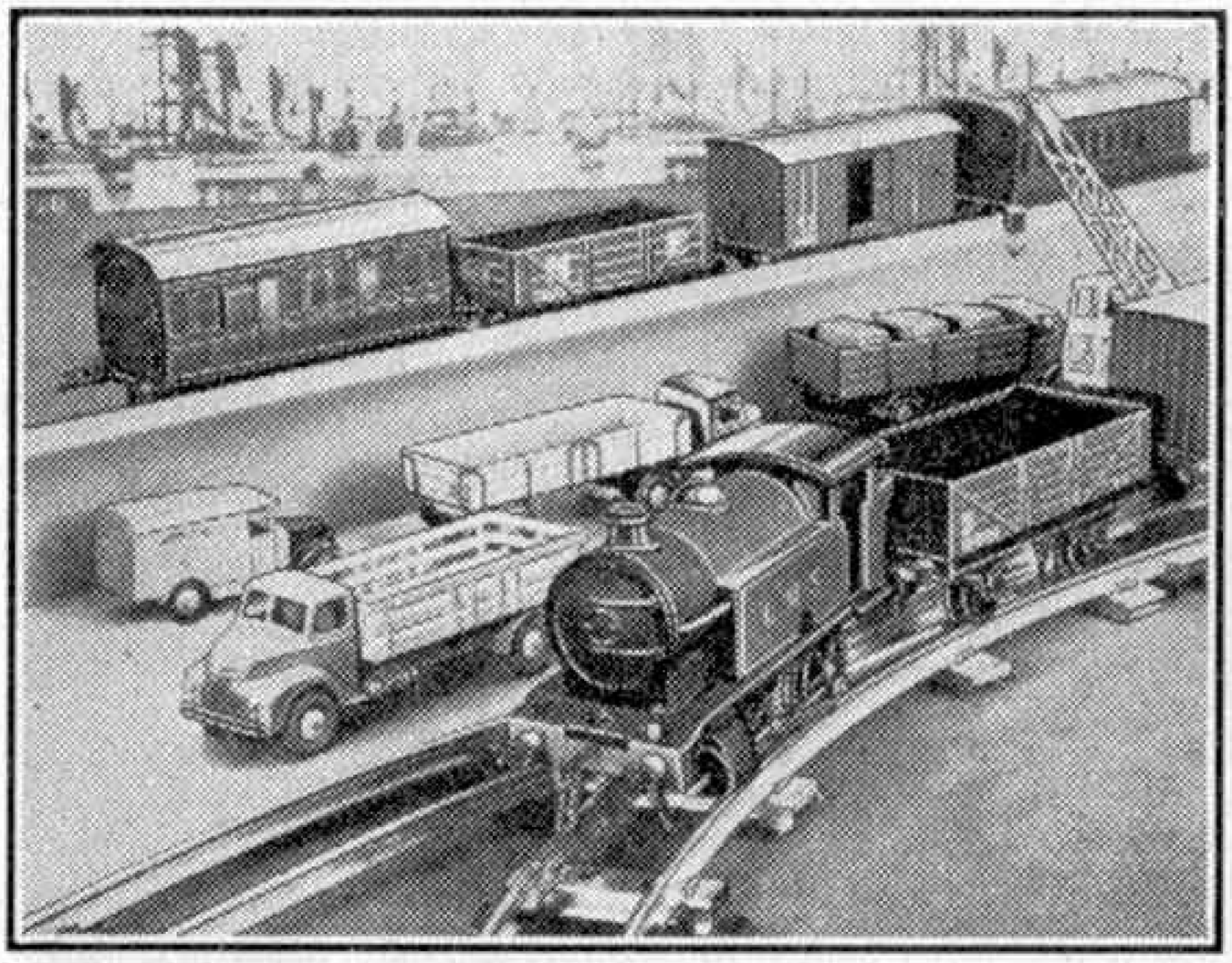
The Coles Mobile Crane, No. 571, is a handy piece of equipment that can be driven almost anywhere in the goods yard or depot. Its slewing action and the fact that the jib can be raised and lowered provide features of which a good crane operator can take full advantage.



Road mending in progress alongside a Hornby railway. The Dinky Toys vehicles shown are excellent for purposes of this kind.

Many Dinky Toys and some Supertoys are specially good for lineside purposes, while such items as the Diesel Roller, No. 25p, the Massey-Harris Tractor, No. 27a, and the agricultural vehicles of the Dinky Toys range make excellent loads in themselves for Hornby Flat Trucks. Miniature loads can be fixed up by any Hornby Railway boy with a little ingenuity and nimble fingers. Such things as little wooden cases can be knocked up out of scrap wood. It is often possible to use small cartons or containers, cotton bobbins and other oddments that are found in every household.

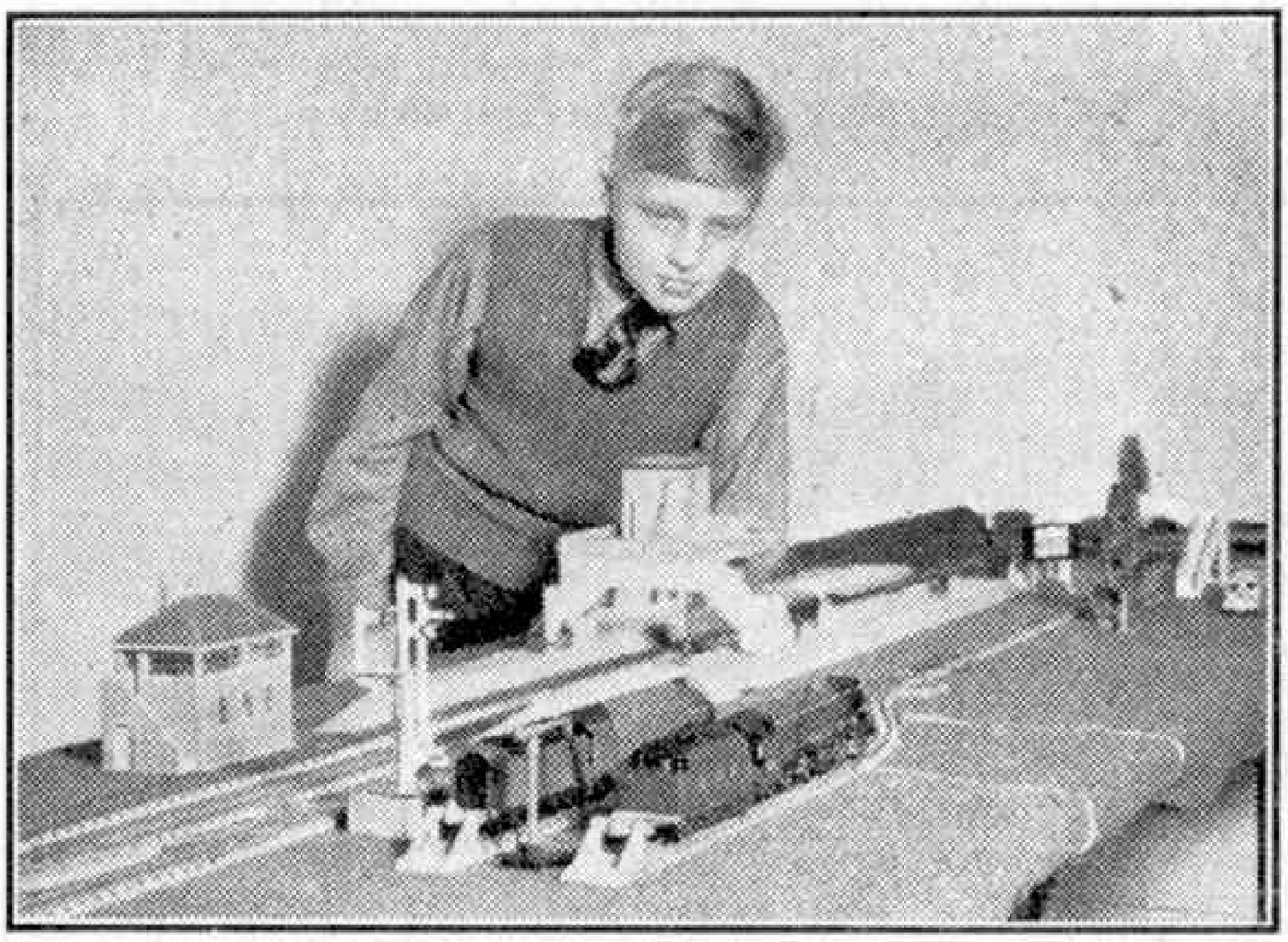
Hills, buildings and scenery form a separate part of the lineside additions to a Hornby system and hints on such items have been given in previous issues from time to time. An interesting background scene can be very effective, and at times coloured cuttings from magazines and periodicals can be pieced together in quite a fascinating manner. Shipping or travel books sometimes yield useful material for this purpose.



Goods yard operations on a Hornby layout. Note the dockside background built up from separate illustrations.

The Progress of a Hornby-Dublo Railway

THE progress of 18 months' development is reflected in the accompanying photographs of the Hornby-Dublo layout of "*M.M.*" reader G. M. Simmons, of Cheltenham. Here is a layout that began with a "*Duchess of Atholl*" train set, and has been built up gradually until now the system occupies a space of about 10 ft. 6 in. by 6 ft. Much has been done to improve the lineside, so that the system is by no means "all railway."



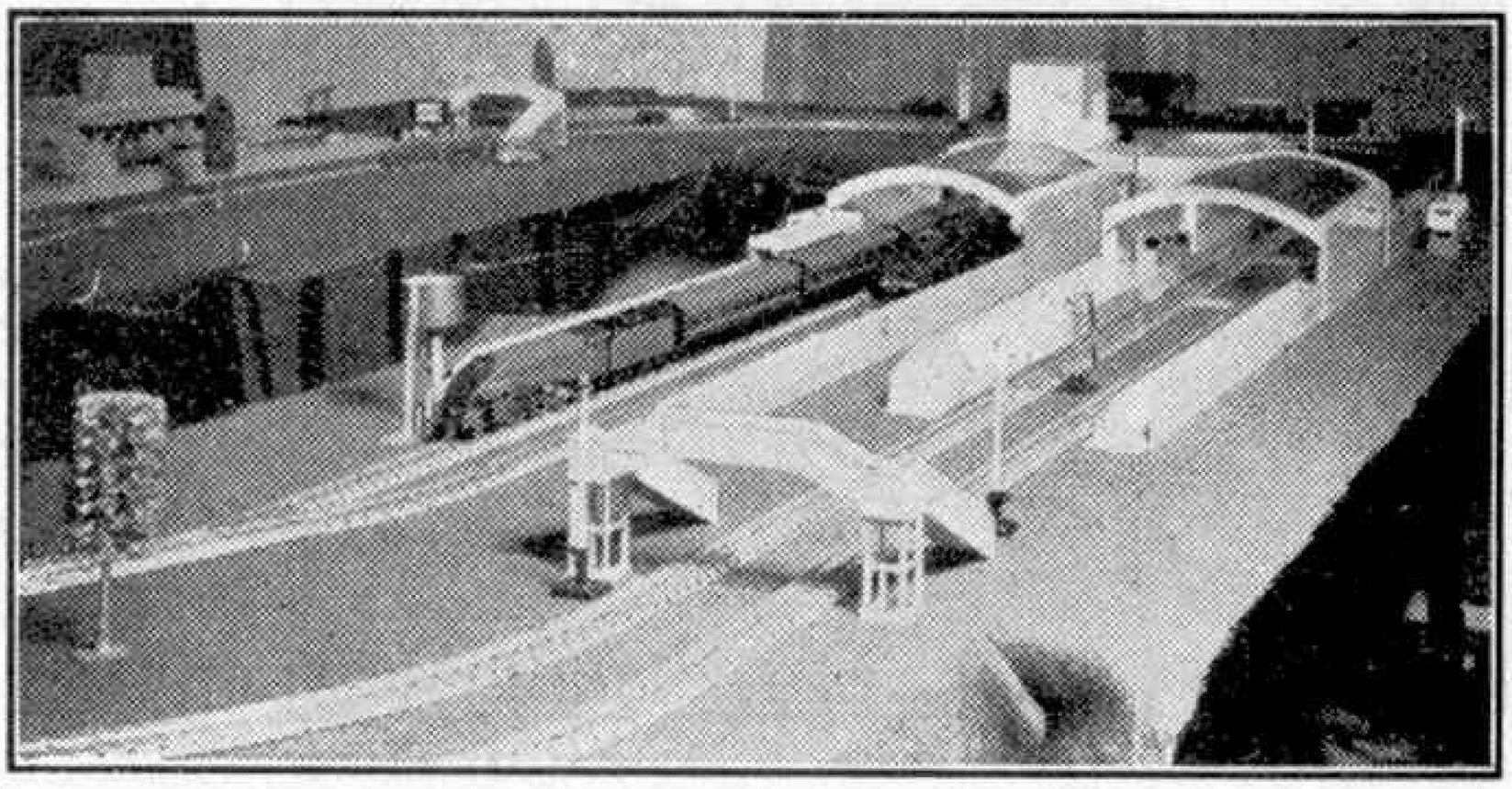
G. M. Simmons, of Cheltenham, with his Hornby-Dublo railway. The photographs on this page are by Eagle Photos (Cheltenham) Ltd.

The layout has a continuous double road outer main line, and there are two main stations with track so arranged that point-to-point working between them is possible, as well as long non-stop runs. The main line itself is permanent, but as the system is still growing the siding arrangements are not regarded as final. From this point of view it is useful that the stations are sectional and can be built up in many different ways. In fact, since the photographs were taken the principal station, which is known as "*Fosters Square*" and boasts an all-over roof, has had another platform added.

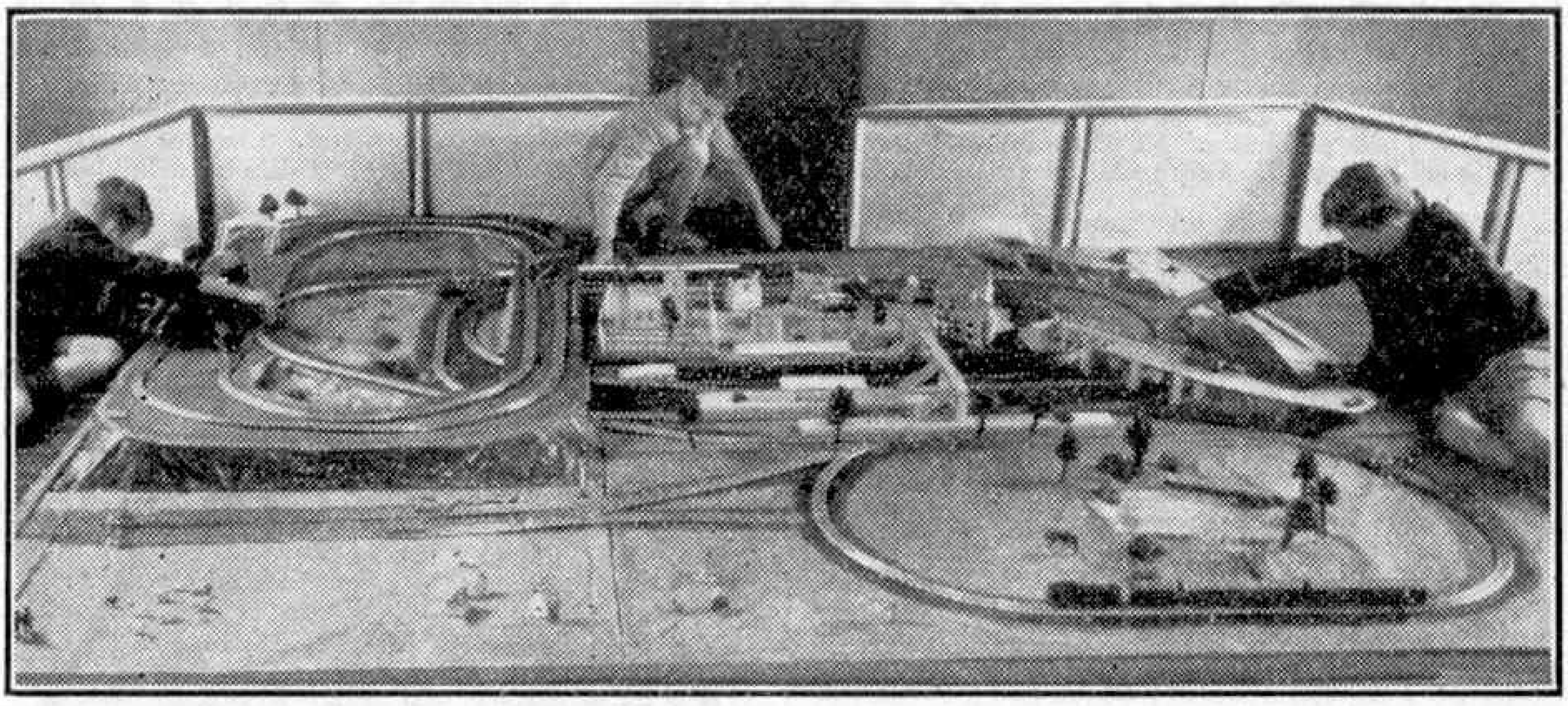
Station nameboards and other items have been made up with matchsticks and other oddments, and the track is fenced or provided with boundary walls where necessary. The buildings and various other accessories have been made at home, but Hornby-Dublo Signals are gradually replacing the original home-made ones. The "Locomotive Department" have installed several Hornby-Dublo Water Cranes at convenient locations.

As an aid to traffic working the road serving platform 3 at "*Fosters Square*" is fitted up with an Isolating Rail and Switch, so that a train can stand there on the isolated section while another is being made up. Present plans look forward to the installation of more of these Rails and Switches.

Apart from the original Set, the locomotives and rolling stock have been added as opportunity has offered. There are now two "*Duchess*" 4–6–2s and one "*Sir Nigel Gresley*" for the main passenger traffic. One L.N.E.R. and five L.M.S. Corridor Coaches constitute the passenger stock, and there are various goods wagons. A Hornby-Dublo Tank Locomotive handles the latter, and in addition carries out station pilot duties in shunting empty passenger stock and making up trains.



A general view of the layout. The outer double track main line is continuous.



Three of the four boys who arranged this Hornby-Dublo display are busy with their layout in this picture. Photograph by courtesy of Norman Greville, Maidenhead.

A Prize-winning Hornby-Dublo System

WE are sure that all "*M.M.*" readers will be interested in the Hornby-Dublo layout shown above. This extensive display was the work of four boys—John Twidell, who sent us the notes on which this description is based, Tony Bernard, Donald Bird and Michael Clark, all of Winbury School, Maidenhead. The realistic system that their joint efforts produced gained them a prize in a "Hobbies Exhibition" at their School.

The railway is arranged in sections on four separate pieces of baseboard accommodated on the School stage for the purpose of the Exhibition. The complete layout consists of a series of connected oval tracks and two of the ovals each has a double line. These are respectively the high-level system shown to the left of the photograph and the low-level main line in the background.

In the front on the right of the picture there is a single oval track encircling some miniature countryside features, including a dummy pond. The sidings extending from this oval are brought right across the baseboard at the end of the elevated track. Both the double and the single low-level oval tracks serve an extensive station with five platform faces, and the space inside the double track is devoted to a miniature village. The effect of this adds much to the realism of the system. A long road overbridge supported on several columns, with inclined approaches, gives access by road to the village, and good use is made of Dinky Toys motor vehicles along the roads and round about the buildings.

The arrangement of the track itself includes some interesting features. The inner and outer lines of the double tracks in each case are joined by crossover points. In addition other connections run between these up and down lines, in the form of long loops incorporating an isolating section on which engines can be held when moving from one track to the other. This scheme is found very useful during operations. Each of the principal tracks forms a separate main section electrically and some realistic operations are possible.

For working the trains there are five Hornby-Dublo engines, two of these being "*Duchess of Atholl*" models, with one "*Sir Nigel Gresley*" and two 0–6–2 Tanks. The duties of the engines are well varied, and in the illustration one of the Tanks can be seen on a passenger train traversing the oval track in the foreground. Both L.M.S. and L.N.E.R. type coaches are used, and a fair variety of goods rolling stock.

Various Hornby-Dublo accessories, including Signals, a Loading Gauge and a Footbridge, are placed at various points on the system. The countryside surrounding the line has been worked up in an attractive manner with fields and some trees and bushes. The raised section of track is carried over dummy earthworks and at the opposite end of the line there is a low hilly ridge that separates the railway from the road.

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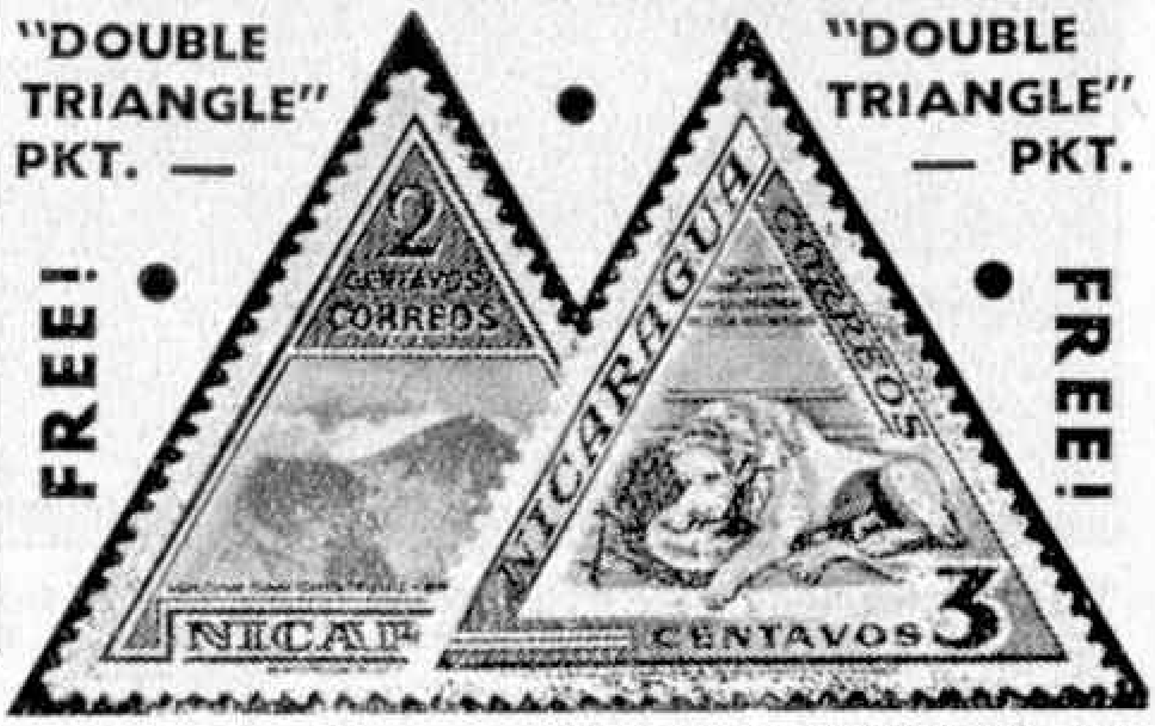

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Stamp Collecting

The Sudan Jubilee

By F. Riley, B.Sc.

MANY of my readers must have noted the appearance earlier this year of the pictorial air mail set from the Sudan that supplies the illustrations on this page. There have been occasional pictorial stamps from that country, but this is the first long set. Throughout its 53 years indeed the Sudan has used practically only one design, the Arab mail carrier on a camel who must be familiar to every stamp collector.

For 16 years before 1897 the Sudan, a vast country of a million square miles inhabited by four million people of many races, was under the domination of the Mahdi and his successor the Khalifa. The Mahdi was a Sudanese who in 1881 started a rebellion against the Egyptians, then ruling the country, and overwhelmed the forces that tried to maintain order. General Gordon was sent to try to bring out the remnants of the Egyptians, but he was besieged in Khartoum, and was killed when the capital was captured. British forces that tried to extricate him and his troops failed to reach him in time.

The Sudan remained under the control of the rebels until they were crushed by an Anglo-Egyptian force under Lord Kitchener. As parts of the Sudan were occupied, stamps of Egypt overprinted with the name of the country in English and Arabic were brought into use, but in 1897 Kitchener wanted a new stamp, and for it he accepted a design submitted by Colonel E. A. Stanton. For this Colonel Stanton had the inspiration to make use of the camel, practically the only means of transport over great areas of the Sudan, most of which is desert.

This was the beginning of the camel stamp in the Sudan. It is not often that a stamp design has such a long life as the one this camel pictorial was to enjoy.

It was issued on 1st March 1898, and with certain modifications it has continued in use practically ever since. The only real break, and that a short one, came at a time during the war when stamp printing was difficult. To fill the gap special stamps were printed quickly in Bombay, and for this a palm tree design was chosen. This issue did not last very long and a return was made to the famous camel design as soon as possible.

The camel is the beast of burden throughout the Sudan. A fast riding camel can travel enormous distances at speed, and indeed over a long course provides quicker transport than a horse. It was the obvious choice for carrying mails in a country devoid of railways and roads, and an equally appropriate subject for a Sudanese stamp design. The jubilee of this stamp in 1948 was commemorated by the appearance of a stamp in which the original 2 p. stamp of 1898 provided the main design, with an ornamental border carrying the commemorative dates and the inscriptions "Sudan Stamp Jubilee" in English and "The 50th Anniversary of the Sudan Postage Stamp" in Arabic. The stamps were issued on 1st October 1948, but the actual jubilee was on 1st March of that year.

These stamps have provided advanced collectors with wonderful opportunities of study, and whole books have been written about their printing, varieties and so on. They provide indeed a fruitful field for specialists.

Although the camel design has been so prominent on Sudanese stamps all these years there have been others, notably on stamps of an issue of 1935 that marked the 50th anniversary of the death of General Gordon.

There were three designs in this issue. One showed a portrait of General Gordon himself; another illustrated the Gordon Memorial Service held in Khartoum on its recovery by Kitchener; and the third the Gordon Memorial College built in the city. Earlier Gordon had been commemorated on a stamp issue of 1931, the design of which shows the statue of the General in Khartoum.

Ever since the Mahdi was crushed the Sudan has been under the joint dominion of Great Britain and Egypt. The fruitful and settled portions are chiefly on the banks of the Nile, which flows through the Sudan on its way northward from Uganda. In its course there it is called the White Nile, and at Khartoum it is joined by the Blue Nile, which rises in the highlands of Abyssinia. The Nile is indeed the centre of Sudanese life, providing water for irrigation and a highway for steamer traffic. Control of the Blue Nile by means of dams will greatly increase water resources and add to the wealth of the country, in which cotton is being increasingly grown.

The part played by the Nile in the Sudan is illustrated in the new issue by the inclusion of a design showing a Nile post boat, and there is a reminder of the importance of irrigation in another design showing a primitive Sudanese water wheel.

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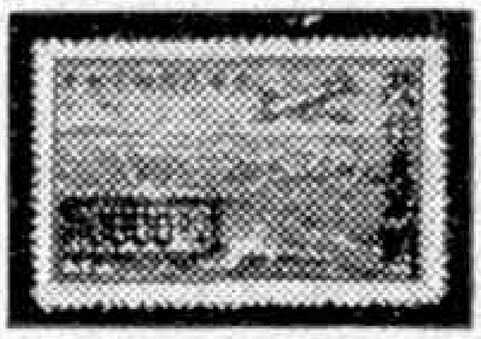

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For other Stamp Advertisements see page 520.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

COLLECTORS of South African stamps are used to having the extra trouble of keeping their stamps in pairs. As they are alternately in English and Afrikaans, it has been the fashion to keep them that way, even used. If mint stamps become separated, as they easily do, collectors simply won't look at them, and many will not take used unless they are in pairs. Of course many stamps do become separated, so dealers and collectors alike were delighted at the news that in future South African Stamps will be bi-lingual.

Now that problem has been solved another has cropped up, for on 27th September Australia issued two stamps, *se tenant* as collectors say, to commemorate the centenary of the issue of Australia's first postage stamps. It is quite a good idea to issue the stamps. As collectors provide so much cash for postal administrations up and down the world, it is only fair that the objects of their fancy should receive recognition. Moreover, these two new Australian stamps are quite attractive, but the idea of printing the two different stamps side by side is not to be comended and collectors will not like it a bit. Nevertheless the stamps will prove as popular as did the U.P.U. stamp of the same country.

As these "Postal Commemoratives" will only be on sale until Christmas, make sure of getting your horizontal pair, the best way to collect them, but their very popularity will mitigate against their ultimate value, so don't think that they will ever be worth very much.

Although there are many stamps to pick from, the writer of these notes cannot resist illustrating from time to time one of America's commemoratives. These stamps are generally attractive, though as a rule the colours leave a good deal to be desired, and they are well within the reach of every collector no matter how modest his means may be.

Many collectors grumble that they are exploited by various post offices. No post office exercises pressure on any collector to buy its stamps, and as far as the U.S.A. is concerned, its handsome issues are printed in such large numbers that a single copper or so will buy any of them while they are current. If any collector takes the trouble to get nice used copies of all Uncle Sam's commemorative stamps, and then goes to the local public library to search out details of the happenings that are commemorated, he can form a collection that will be a delight to view.

At large stamp exhibitions one can see collections of stamps worth thousands—the value of the stamps on show in London last May was said to be actually millions—and many are superbly written up by professionals. Rather than helping stamp collecting, this tends to discourage potential junior collectors, who think they can never emulate such displays; but there is often more real philatelic worth in some small unpretentious collection than in half a dozen of these show conglomerations.

This professional writing-up also is often discouraging, but it is surprising how easily one can get the knack of printing decently if a bit of pains is taken. Don't forget that it is very much easier to learn to print nicely than it is to write well. That may surprise some young collectors, but it is a fact. Just practise on a few sheets of paper with lines, which are a great help, and in no time you will be able to print attractively, and thus to write up your own collection.

Stamps depicting ships are the most popular with thematic collectors, but a good second theme is floral and the new set from Hungary on these lines will take a lot of beating. This Magyar set is rather like the flower set issued a year or so ago by Austria and is really beautiful, another proof of the high standard some of these European countries have reached in the production of artistic stamps. Countries like Hungary, Austria, France, etc., literally bring out a new set every week, one more beautiful than the other, and all from one printing works in each country. Yet the fuss we make about producing a set of mediocre stamps, when it is taken into account what other countries can do, is beyond belief.

There are many stamps depicting flowers. One collector has gone to the trouble of raiding various nurserymen's catalogues, etc., and alongside each stamp has managed to stick a large illustration of the flower shown. The result is admirable. It actually won a prize, though the collector admitted that he had only spent about 15/- apart from the cost of the album on the whole affair.

Our fourth illustration is from a set issued by Argentina in honour of their liberator General San Martin. It is not uncommon for a country to slight and ignore one of its great sons during his life, and then to use his deeds after his death as a peg on which to hang their patriotism. This is precisely what happened to this great soldier. The set itself is beautifully produced.

Britain's New Power Stations—(*Cont. from page 489*)

of the power station is of course the turbine room, which runs down through the centre of the building. Six generating sets of 30,000 kW turbo-alternators will ultimately be in operation here. These machines, set in pairs, are capable of 3,000 revolutions a minute, operating with steam at a pressure of about 600 lb. per sq. in. The turbines are of the two-cylinder type, with two steam inlets to the high-pressure cylinder, which in turn exhausts to the centre of the low-pressure one arranged for double flow to the condensing plant. Twin condensers linked with each machine condense the steam from the turbines and return it to the boiler for re-use.

Water in power station boilers must be absolutely free from impurities, and so only pure distilled water can be used for the purpose. This station is equipped with four distillation plants, together capable of distilling 60,000 lb. of water every hour.

Vast quantities of water are needed for condenser cooling purposes, and when Walsall is developed to its full capacity the intake will total nearly 13,000,000 gallons per hour. This is all obtained by pumping from the adjacent canal, and for over 20 years the former power station obtained its requirements this way without the need for cooling towers. The quantity of water pumped direct is insufficient for the new station, however, and so six cooling towers, arranged in two groups of three each, have been erected to cool water after it has passed through the condensers for use again and again. Each tower is designed to cool 1,600,000 gallons of water hourly and rises to a height of 240 ft. from the ground.

The system of water irrigation inside the cooling towers is constructed on a framework of prefabricated ferro-concrete units, and the water is distributed from rosette sprayers attached to asbestos cement pipes. Condensers and towers are linked by one 42-in. diameter suction pipe and a similar delivery pipe for each machine. Although the three towers in each group are interconnected for efficient operation, each may be isolated from the other two when necessary for cleaning or repair work.

The power station control room is in the heart of the main building adjacent to the turbine house, and here the wonderful instrument panels and diagrams show the control engineer at a glance the electrical conditions at any moment. From the remote control desk in the centre of the room the engineer makes the necessary voltage, current and load adjustments of the turbo-alternators and Grid transformers. Surrounding this desk are the generating machine panels. The main switchgear controlling the power flowing from the generators is housed in another part of the station, but is electrically operated from the central control room.

Before it can be fed into the Grid for general distribution, the power generated by Walsall at 33,000 v. has to be stepped up to 132,000 v. This is done by means of two transformers installed at a sub-station close by, which handle that part of the output not used to meet the local demands. From this sub-station 132,000-v. transmission lines run on to the main Grid sub-station at Willenhall, about five miles distant.

The Romance of Bridges—(*Continued from page 495*)

San Francisco Bay, its two great towers as high as 60-storey skyscrapers. And inside the Gate the transbay bridge hangs like a golden necklace over the water, with its six lanes for cars above a lower "deck" for heavy commercial traffic and local trains. Yet what you can see of these steel giant suspensions is perhaps still less remarkable than those underwater foundations that enable the bridges to stand on the floor of a tide-washed bay There is an engineering saying that big bridges are built under water.

Among the superstitions connected with bridge building is the belief, said to be prevalent in certain South American countries, that bad luck will follow the opening of a bridge that has been built without loss of life. In primitive times it was felt that to bridge a river was to take liberties with the river god, who usually could be appeased only by a human sacrifice. A less gloomy superstition in another part of the world is the Chinese belief that a crooked bridge will foil evil spirits. And so we get the quaint zig-zag bridge leading to the beautiful Willow Pattern Tea House in the heart of Shanghai.

County Donegal Railways—(*Continued from p. 486*)

The County Donegal is a self-contained system, and extremely useful work is done in overhauls and repairs to rolling stock in their locomotive, railcar, carriage and wagon repair shops. Here one finds that the art of craftsmanship is not gone, and that team-work is the keynote. "*Make do and Mend*" has been a common cry in recent times but the County Donegal can claim to have been the originators of this policy many years ago. There is ample evidence of adaptability and ingenuity in the maintenance of their plant and equipment. All the work is done with quite remarkable thoroughness.

The steam locomotives on the County Donegal Railways are not numerous but they are tough; they have to be. There are eleven engines, all tanks. They are divided between the 4–6–4 type, of which one is shown in the picture at the top of page 486, and the 2–6–4 type. The general design involves outside cylinders, as is usual in narrow-gauge construction, and the wheel frames are outside as well. The 4–6–4s, however, have bogies with inside frames. The 4–6–4s are the older type and their service dates from 1904. Of the 2–6–4s, those most recently built, in 1912, are notable as being the only narrow-gauge engines in Ireland to be provided with superheaters. A ride on the footplate of one of these sturdy tanks is a thrilling experience, particularly when the engine is putting forth its best efforts on the climb to Barnesmore.

County Donegal steam locomotives are painted a brilliant shade of red, and the coaching stock and railcars are painted red and cream. This smart colour scheme is a pleasant change from the usual tendency on local systems of this kind to paint the stock in more or less undistinguished colours.

In a Wild Goose Sanctuary—(*Continued from p. 506*)

arrivals and departure dates recorded, and now an occasional batch of geese is caught and ringed with aluminium leg bands. At first the problem of how to catch these strong-winged birds unharmed seemed insoluble, until a device was perfected with the aid of Messrs. Schermuly Brothers, who make life-saving pistol rockets for use at sea. A tough, wide-meshed net, 25 yards square, is firmly pegged into the ground out on the grassy flats by two adjoining corners. The two opposite corners are fastened to small 1-lb. rockets, which are fired electrically by remote control from a hidden spot close by. The net is carefully laid where the geese may be expected to settle and fired when most birds are within range. The first test with this net caught 31 geese, for ringing purposes, and further work in this direction is still going on. By marking birds in this way, and releasing them unhurt, some idea of their migrational movements can be obtained. The Trust hopes to ring many more soon.

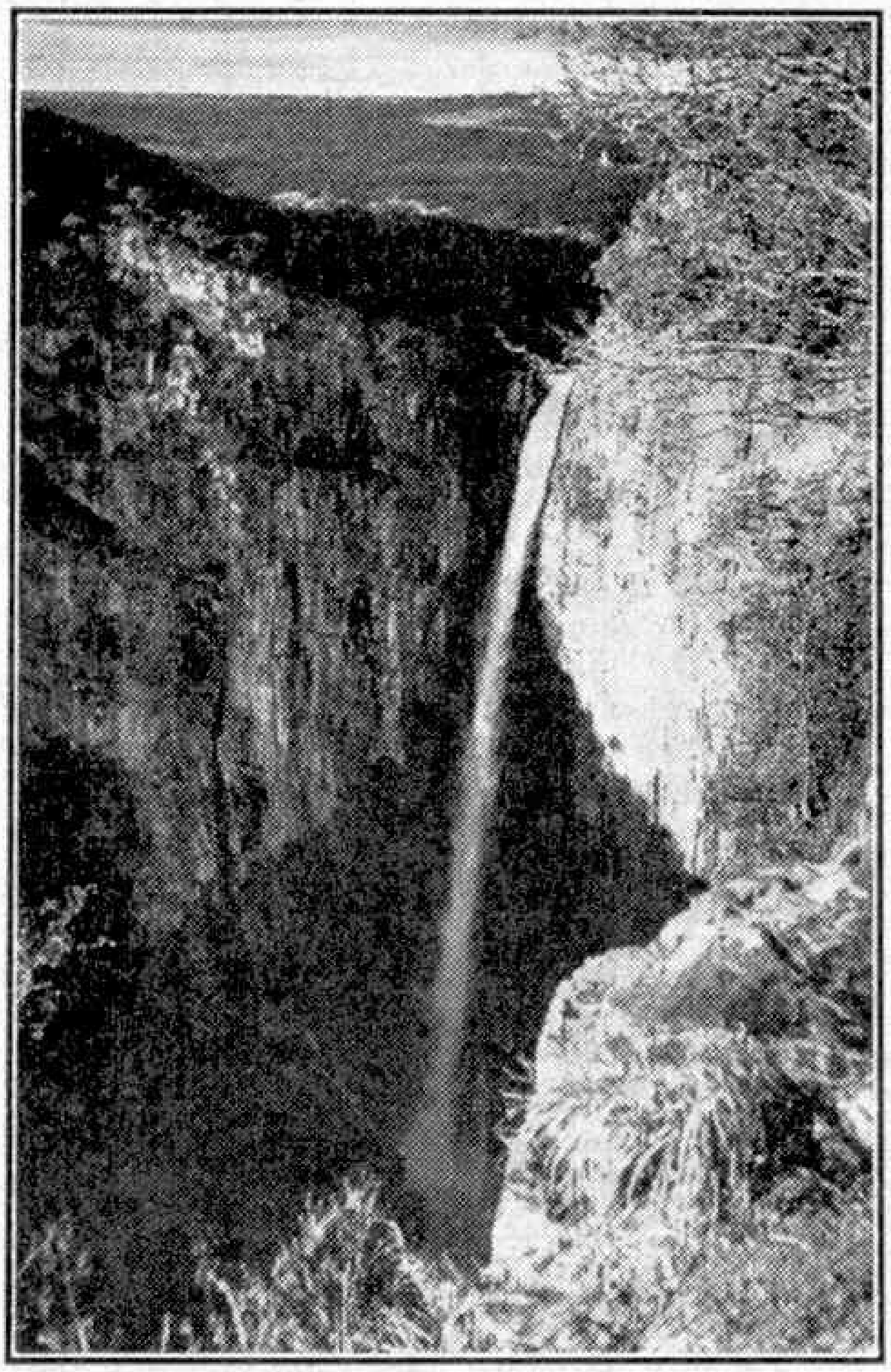
Peter Scott has worked especially hard in building up the waterfowl collection. Over 600 birds of about 100 different species can be seen in the open pens behind the sanctuary buildings. Among them are snow geese from Greenland, black swans from Australia, Canada geese from Manitoba, teal from Iran and America, and many other exotic specimens from Hungary, Arizona, South Africa, Spitzbergen and elsewhere. Many are tame enough to feed from visitors' hands, and some are able to fly around inside the grounds. Several breed each year, and a number of chicks from the brilliantly-coloured adults have been reared successfully. This collection alone is well worth a visit to the New Grounds; the birds are at their best, as regards plumage coloration, in April and May.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

The Kalambo Falls

The Kalambo Falls are the highest in Africa. They are situated on the Kalambo River. This flows into Lake Tanganyika and forms part of the boundary between Northern Rhodesia and Tanganyika



This impressive waterfall has a sheer drop of 704 ft. and is the highest in Africa. It is in the course of the Kalambo River, in Northern Rhodesia. Photograph by P. J. Hunt, Lusaka.

Territory. The waterfall itself is 21 miles from Abercorn, a small township of about 160 Europeans in the extreme north-east of Northern Rhodesia.

The Falls are reached by a corrugated road that winds through dense tree-clad slopes and rocky valleys, with ranges of hills piling up in the background. From certain points along the route there is a magnificent view of Lake Tanganyika, about 10 miles away. From the road there is a winding footpath through the trees down to the river. As the Falls are approached a faint sound can be heard, and this becomes louder until eventually it is found that it is caused by the river rushing over a cliff of enormous height. The narrow column of water that tumbles over the cliff seems to take ages to reach the bottom as it plunges to a depth of 704 ft.

To get the best view of the white column of water from the lip of the cliff one must edge out on to a projecting rock. Those whose nerves are not in good condition should do this on all fours, as the sheer drop of hundreds of feet, magnificent as undoubtedly it is, tends to unbalance one. A path along the top of the cliff leads to another and safer viewpoint from which the Falls can be seen clearly. Below the main Falls the river descends in a number of smaller cascades until it reaches the bottom of the volcanic gorge through which it flows.

P. J. HUNT
(Lusaka, N. Rhodesia).

A Living Fossil

In New Zealand we have an interesting reptile known as the tuatara. This is rare now, but I saw two of these creatures at the Auckland Zoo before they were sent to Australia for scientific purposes.

The tuatara is from nine to 18 inches long and its wrinkled skin is greeny-grey in colour. It is interesting because it is a relic of prehistoric times, fossil specimens being identical with those alive to-day. Originally it lived on the mainland, but now is found only on islands off the coast, and is not seen farther south than Cook Strait, between the North and South Islands. It is capable of remaining still for hours, and in winter likes to bask in the sunshine, although it is nocturnal in its habits. In its natural state it lives in the burrows made by terns.

G. SKINNER (Auckland, N.Z.).

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

A Meccano Figureword

Our first competition this month is concerned with the names of Meccano parts, or with words forming parts of these names. In it there are seven words, each of six letters, and in the diagram on this page there are seven horizontal rows, one for each of these words, which readers are asked to find with the aid of the clues given here.

In the last column of the diagram are numbers marked "Horizontal Totals." These are made up by giving numbers to the letters of the alphabet, A being 1, B 2, C 3, and so on down to Z, the value of which is 26. The numbers representing the letters of each name must add up to the horizontal totals shown, and in addition the letters must be such that the vertical totals are those shown at the foot of the diagram.

As a help to make a start we give the first letter of the first name. This is G, the value of which is 7. Thus the first Meccano Part name required is one beginning with G, the horizontal total of the numbers represented by the letters being 61, and G contributes 7 to the first vertical total of 73.

There will be two sections in this Contest, for Home and Overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded for the three best entries in order of merit. The diagram must not be cut from the page; entries must be made on separate sheets, and in the event of a tie judges will take originality of presentation into consideration.

Entries must be addressed "*November Figureword Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 30th December; Overseas Section, 31st March, 1951.

G						61	HORIZONTAL TOTALS
						61	
						73	
						91	
						90	
						67	
						45	
73	107	76	95	31	106		
VERTICAL TOTALS							

Locomotive Names Contest

Competitions dealing with locomotive names are always extremely popular, and for this month we have arranged another that should prove attractive to all railway enthusiasts. Below are ten clues, each of which leads directly to the name of a British Railways locomotive, and we ask readers to find these names.

1. The Broad Gauge champion.
2. Denotes readiness to sail.
3. Doesn't really burn and cannot fly.
4. Claims to span the World.
5. North end of a one-time narrow-gauge railway.
6. Shiny south-coast resort.
7. Sapper.
8. He held up the World.
9. Father of the seas.
10. A beetle.

When a competitor is satisfied that he has found the names indicated by the clues, he should make a list of them in numbered order stating also the running number, class and wheel arrangement of each engine concerned, with the Region of British Railways to which each belongs.

There will be the usual two sections, Home and Overseas respectively, and in each prizes to the value of 21/–, 15/– and 10/6 will be awarded for the best efforts in order of merit. There will also be a number of consolation prizes. Entries should be written on one side of the paper only, and each should bear the full name, age and address of the competitor. Envelopes containing them should be addressed to "*November Locomotive Names Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 30th December; Overseas Section, 31st March, 1951.

November Photographic Contest

The eleventh of our 1950 series of photographic contests is a general one, in which we invite readers to send in prints of any subject. There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate Overseas Sections, and in each section prizes of 21/–, 15/– and 10/6 will be awarded. Entries should be addressed "*November Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 30th November; Overseas Section, 28th February, 1951.

Fireside Fun

"Now work this out, Smith. If six men reap a field of wheat in three days, how long would it take eight men to reap it?"

"Four days, sir."

"Rubbish. What's wrong with that answer, Brown?"

"Please sir, they couldn't reap it because the six men had already done it."

* * * *

"Why get your dad to blow yours up? Can't you do it yourself?"

"Shush! If he bursts it he has to buy me another."

* * * *

"I see Green has bought a car."

"Oh, no, he hasn't. His uncle left it to him in his will."

"But he told me he had put all his money into it."

"That's right. He bought two gallons of petrol and poured them into the tank."

* * * *

"It beats me how you are able to eat so much, Johnny. How do you manage it?"

"I don't know. I suppose I've just been lucky."

* * * *

"Thank you for carrying my bag. What's your name, my boy?"

"Billiard Cue, sir."

"That's a queer name. How on earth did you get it?"

"They call me that because I work much better with a tip."

* * *

Referee: "The last thing I want is unpleasantness."
Player: "Any more last wishes?"

BRAIN TEASERS

SQUARE DEALS

Suppose that two coins ars placed in each of the squares in the accompanying diagram. The total number of coins along each side is then six. Now add four coins and re-arrange so that there are still six coins along each side.

"Where's our Alec?"

"I don't know. We were setting off a super rocket and he was holding the stick."

* * * *

ONLY A LITTLE ONE!

x x x x x x x
x x x x x
x x x
x
x x x
x x x x x
x x x x x x x

In the successive lines of the above diagram fill in words found from the following clues: 1, Barefaced; 2, Courage; 3, Consumed; 4, Pounds; 5, Something worn; 6, Whim; 7, Gives up.

If the correct words are found the letters in the vertical column in the middle spell the name of an English County.

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

Here are the answers to our first puzzle last month: 7 (7+7+7); 6 (6+6); 55.

The square at the foot of the page gives the solution to our second puzzle.

The word to which our third puzzle led is CIGARETTE. The clues leading to it are the words Cricket; pIstol; enGine; steAmer; sherRy; JeffrEys; conducTor; redstaıT; and lodestonE.

17	24	1	8	15
23	5	7	14	16
4	6	13	20	22
10	12	19	21	3
11	18	25	2	9

THE ASTRA

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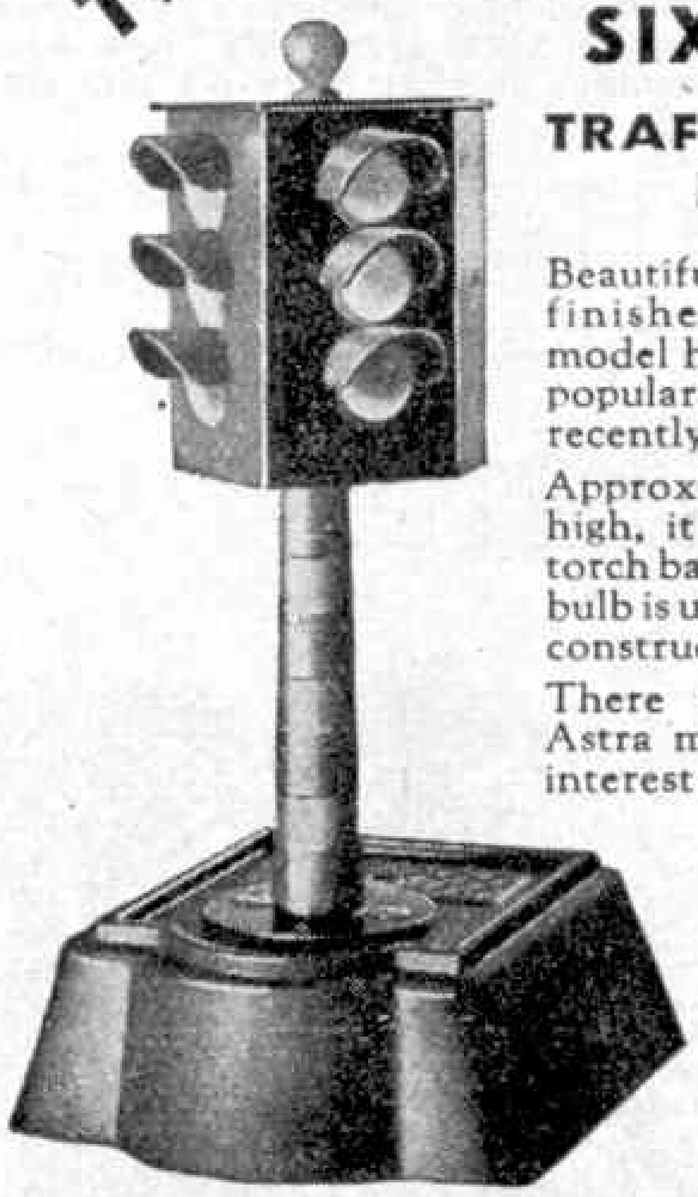

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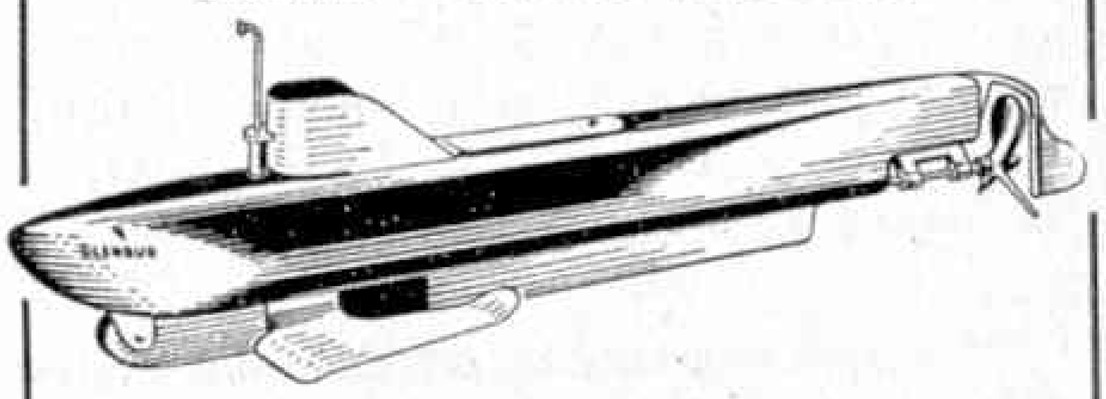

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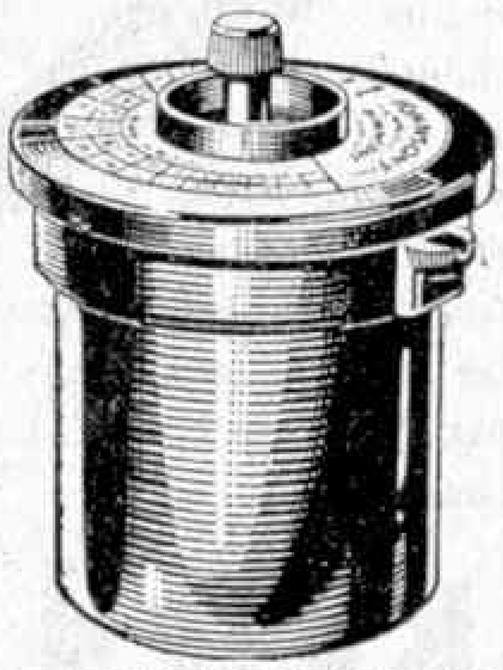

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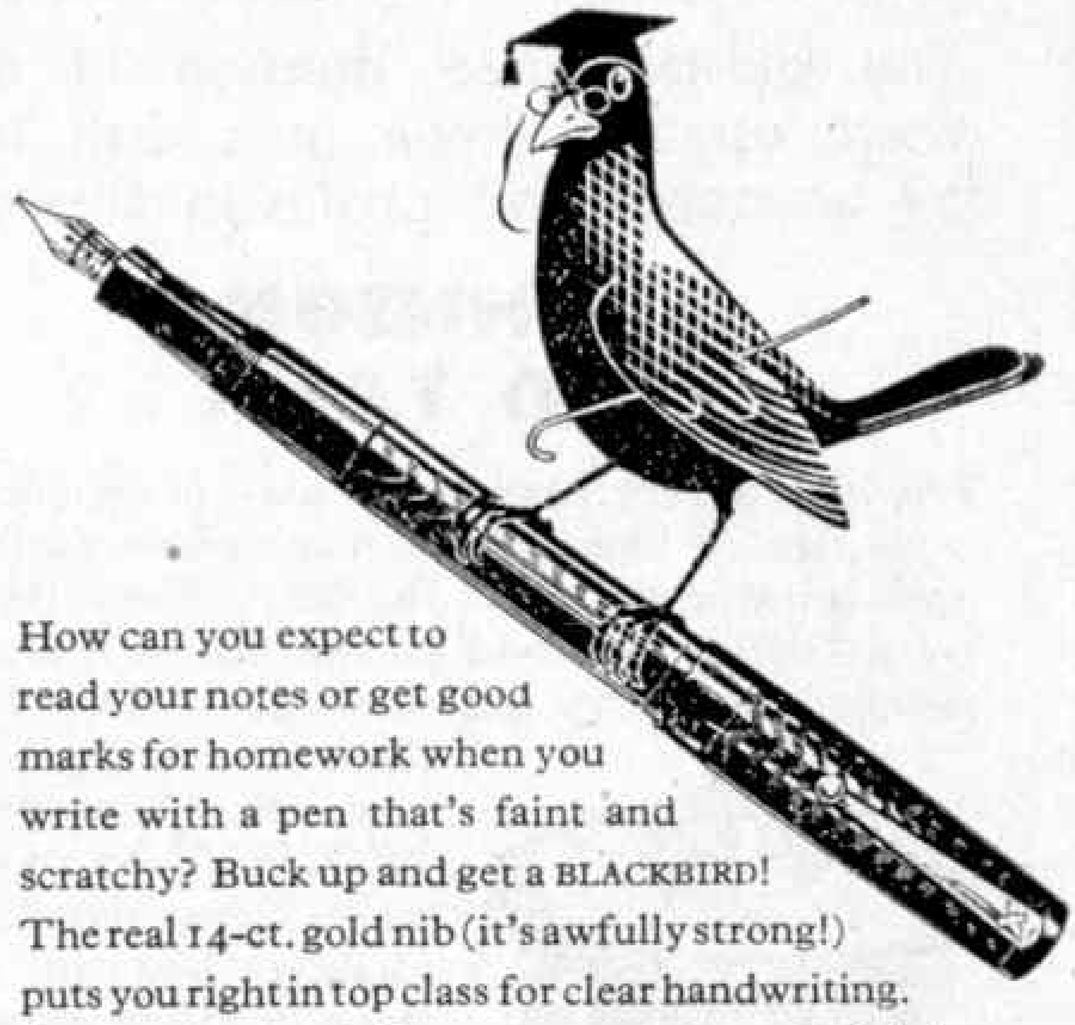

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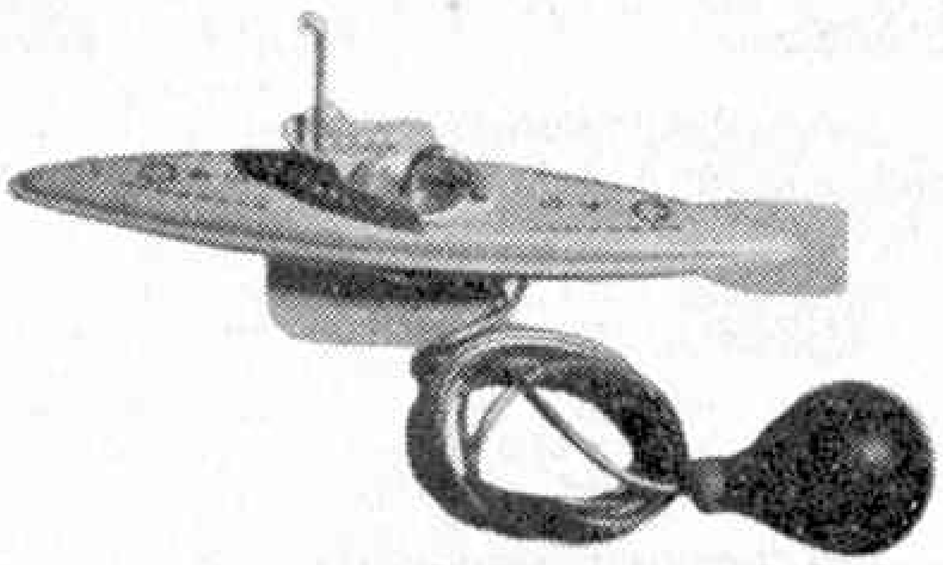

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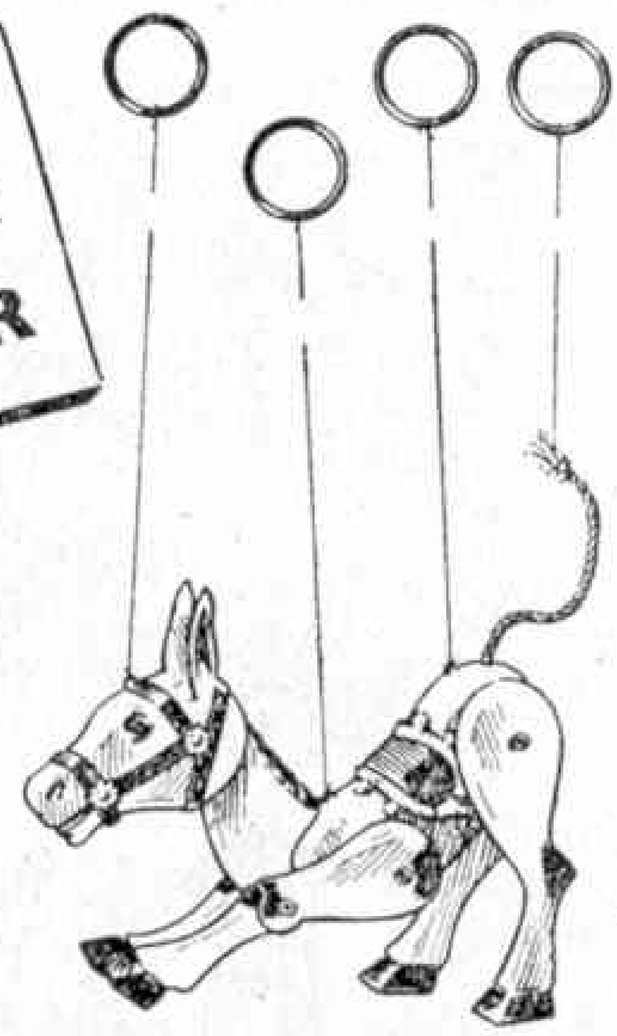

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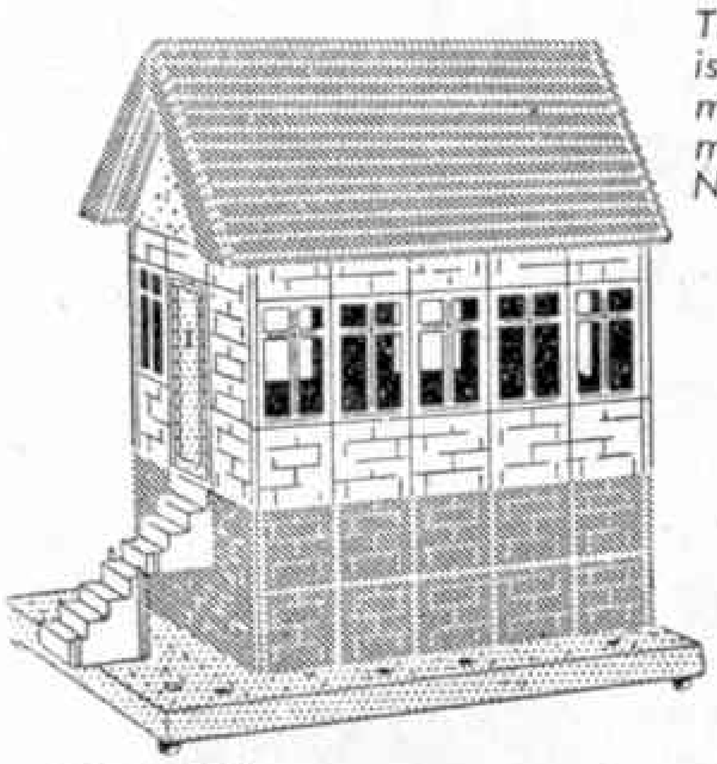

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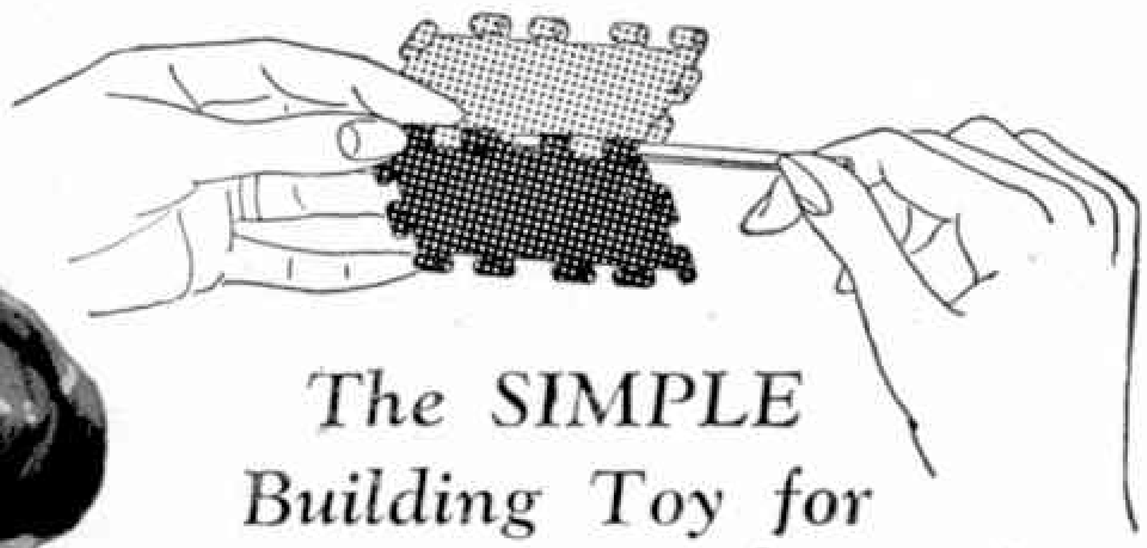
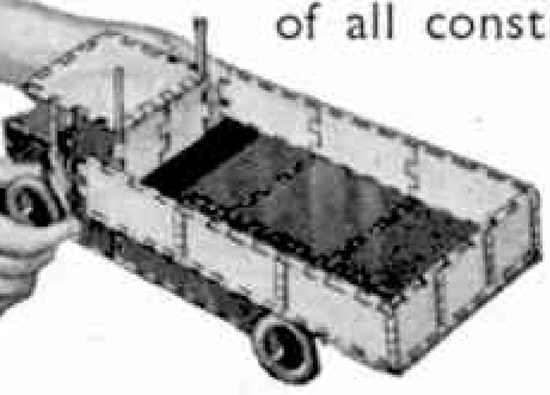
DINKY BUILDER



The SIMPLE Building Toy for Young Folks

Children play happily for hours on end with Dinky Builder. The parts are fitted together in the simplest way without any nuts and bolts. For youngsters it is the best of all constructional toys.



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Another lucky MECCANO Boy

Exciting job making a model crane with Meccano . . . A proper engineering job that really works. When you have played with one model you can take it to pieces, and try out another one—perhaps more difficult! There's no end to the fun, and that's why it's so exciting to have a Meccano Outfit.

Obtainable ONLY from Meccano Dealers

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MECCANO LTD
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